

Railway Age

Vol. 85. September 29, 1928 No. 13



On the Duluth, Missabe & Northern near Duluth, Minn.

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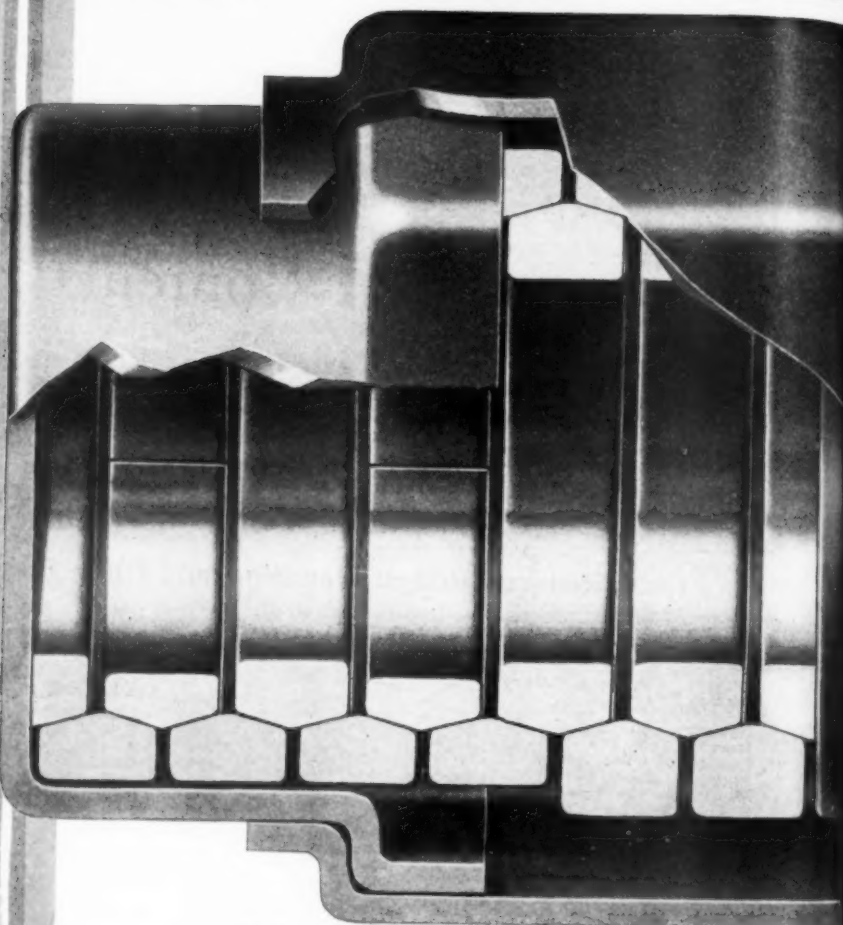
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EDGE



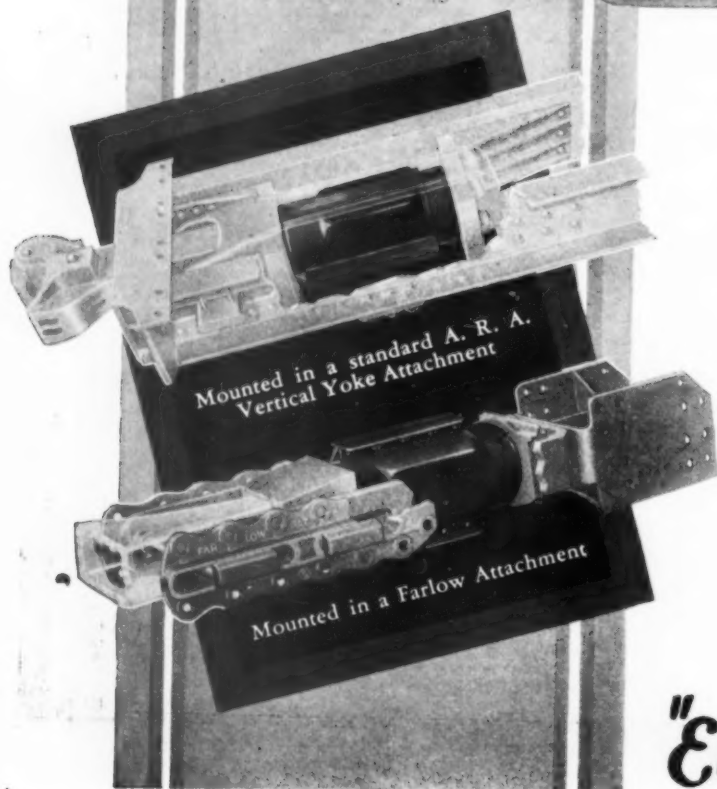
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"Equipment PROTECTION



Railway Age

Vol. 85, No. 13

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Equipment and Supplies Markets

WHILE orders for locomotives and freight cars this year have been somewhat disappointing because of their persistence in lagging behind last year's totals, it is encouraging to note that passenger car orders reported in the *Railway Age* for the first eight months of 1928 were 41.2 per cent. above those reported for the corresponding period of 1927. From January 1 to September 1, 1928, a total of 1,702 units of passenger equipment were ordered, whereas but 1,205 units were purchased in the first two-thirds of 1927. The 1928 structural steel and rail tonnages ordered by the roads afford additional encouragement. A total of 103,913 tons of the former and 336,049 tons of the latter have been purchased this year as against 90,598 tons of structural steel and 333,125 tons of rail ordered during the first two-thirds of 1927.

Machine Tool Life

HOW long should a machine tool last? It must be admitted that much of the machine tool and other equipment in railway shops has long outlived its period of effective serviceability. In other words, the equipment as originally designed combined such excellent qualities of material and workmanship that it is still usable after having been rendered obsolete from an economy and production standpoint by the development of greatly improved, modern equipment of similar character. In the interests of greater railway efficiency it is pleasing to note the growing appreciation of the economic advisability and necessity of replacing obsolete tools. One of the most recent expressions on this subject was made by D. C. Curtis, chief purchasing officer of the Chicago, Milwaukee, St. Paul & Pacific, at the sixteenth annual convention of the American Railway Tool Foremen's Association held at Chicago, September 12-14, inclusive. Discussing the tendency of manufacturers to build excessive strength and durability into certain machine tools, Mr. Curtis said, "A tool should be made so that it will produce a profit for its user. It should be made to last only a reasonable length of time and pay a dividend in that time. Some of the most successful users of tools, particularly in mass production work, build their tools only for a life of five years during which the tools must pay for themselves. This enables the user to take advantage of the improvements that are so rapidly being made, or to discard the tool without loss if conditions change so that it is no longer needed." Doubtless the greatest present need in connection with this matter is for railway officers to adopt every practicable means of acquainting themselves with the operation and productive capacities of the latest types of machine equipment, so that they will be in a position to know when any individual tool has become obsolete and can no longer be operated without loss to the railroad.

Controlling Costs

THE producer of automobiles, or dressed beef, or chewing gum, can control his production. He can decide, based on estimates of probable demand, exactly how many units he will produce in a given month. The railroad has no such control over its production. It must handle the business offered, and "peaks" and "valleys" in the volume of transportation produced are entirely in the control of its patrons. Cost of transporting the commodity is only one of the factors to be considered in the rates charged for that service. No one has ever suggested how to determine, currently and accurately, the cost of moving individual commodities. The control of expenses, sometimes called costs, is accomplished by the various railroads by methods which serve their diversified and practical needs. The railroad officer cannot control his costs and production by separate commodities. He can, however, and does, regulate his efficiency in handling his total volume of business. This is done by the budget system, and by departmental and sub-departmental "bogies" (we are indebted to the Rock Island monthly statement for the latter term). The performance and cost control methods used by the railroads are as scientific and as well adapted to their needs as are the cost accounting systems used in other industries. The railroads control their costs or expenses before they are incurred, or at the time and in the place incurred, rather than afterwards. That is progressive and practical cost control.

Planning Winter Work

WITH summer maintenance of way and improvement work nearing completion, and with the fall months rapidly slipping by, it is not too early for railway engineering officers to give some attention to the mapping out of effective programs of work for their winter forces. All too soon the winter months will be at hand, and while last minute efforts may be sufficient to put snow-fighting equipment in readiness, such efforts are not conducive to an effectively planned program of constructive winter work. In the rush to close up summer and fall work, too often little or no thought is given to the months immediately succeeding and to the planning of work which can be carried out effectively in these months. The result is that four or five months pass in which efforts are directed toward a very indefinite goal. It may be too early to begin worrying about snow brooms and shovels, but it is not too early to start planning the work which should be done during the large part of the winter when brooms and shovels will be idle. Regardless of the severity of the coming winter, most roads have to maintain a considerable part of their summer forces. Will they be employed effectively or ineffectively? It is evident that they will be employed in the least effective manner where the least attention is given

to the mapping out of a definite program for them to follow when not employed in emergency work. No railway officer would undertake his summer work without establishing a goal and a definite plan whereby the goal might be reached. This same practice should apply to winter work, and while the goal may be, of necessity, less distinct and the program less definite, due to unforeseen conditions, nevertheless, it is the surest way to secure the maximum from winter forces.

Advantages of Triple-Crewing

THE practice of working yard engines continuously through three tricks, and often for days at a time, is growing, on western railways particularly. When properly handled, such triple-crewing invariably results in a reduction in engine-house expenses. The abolishment of the necessity for frequent firing up and knocking of fires is productive as well of decreased fuel consumption. Further, a greater utilization may be obtained of the larger and more modern switching power, with an increased average of yard-engine effectiveness as expressed in average cars handled per switch-engine hour and other factors. In brief, triple-crewing saves money and it saves engines. The savings in expenses were brought out in an article covering the results obtained on the Chicago, Rock Island & Pacific by the use of this practice, which appeared in the *Railway Age* of December 31, 1927, page 1317. The advantage of the second factor of saving, the reduction in the number of engines necessary to handle the business of a terminal, is not so obvious. Normally, there is no shortage of terminal power on the roads using the triple-crewing system. During this year's wheat season, however, this advantage was clearly defined. The "combine" method of harvesting, which accentuates the peak business, placed a heavy burden on the terminals of several roads. It was then that the saving in engines by triple-crewing showed in its best light. On the Atchison, Topeka & Santa Fe, for example, despite a record-breaking number of cars handled through the terminals, it was not necessary to transfer yard power. Triple-crewing took care of the peak load and amply justified the claims of its adherents.

Electric Traction Committee Work

THE heavy electric traction committee of the American Electric Railway Association directs attention in its annual report to the close parallel of the work of this committee and that of the Electrical section of the Engineering Division of the American Railway Association, the electric rolling stock committee of the Mechanical division of the A. R. A., and the committee on electrification of the National Electric Light Association. The report states that the duplication of activity by several associations leads to duplication of work for committeemen who are active in more than one association and also leads to duplication of questionnaires for the collection of data and information, with the result that operating companies and manufacturers are discouraged from giving the degree of cooperation needed for keeping up-to-date the study of progress in heavy electric traction development. The report further states that the objectives of these three associations are, to a large extent, similar and recommends that the A. E. R. A. take up with other associations the possibility of coordinating the activities of their corresponding committees, particularly as regards the collection and tabulation of data and in-

formation on the heavy electric traction properties. Roads having electrified sections will undoubtedly endorse this suggestion; it might well be carried still farther, to include other associations and ultimately to provide for a general allotment of tasks by the several committees. The American Institute of Electrical Engineers also receives reports on electric traction and while these are somewhat different in character from those received by the associations previously mentioned, the A. I. E. E. might profitably be included in any consideration of co-ordinated activities. Another body that should not be overlooked is the Association of Railway Electrical Engineers. This organization does not receive a report on heavy electric traction but is active in practically all other branches of electrical work as applied to steam railroads. Certainly there is much to be accomplished by this kind of coordination of committee activities and it is to be hoped that all of the associations involved will take a friendly interest in the suggestion of the A. E. R. A. committee.

Should We Be Discouraged?

THOSE who constantly come in contact with railway officers know that there are times when many of them become discouraged regarding the results of their own work and regarding, also, the future of the railroad industry. The present is a period in which many express such discouragement. During the years 1922 to 1926, railway officers were struggling against many adverse influences, but they were overcoming them. The railways were being affected by losses of passenger business, advances in wages and restrictive regulation, but freight business and earnings were increasing while large economies were being made, and in consequence the percentage of net return earned upon the investment in the industry was increasing. Railway service was being improved. Public sentiment was becoming more friendly. The officers of western railways were greatly dissatisfied with the net returns they were earning, but during the years mentioned there was increasing cheerfulness and optimism among railway officers generally.

Developments since 1926 have been much more unsatisfactory. The net operating income of all groups of railways declined last year. The western roads have done somewhat better this year, but are still falling far short of a fair return. Eastern and southern roads are doing worse than last year. In spite of the unprecedentedly good service being rendered, the railways have been subjected to attacks from various sources that recall their experience in pre-war years. Pressure for advances in wages has continued and has been effective. The pressure for reductions in freight rates, especially on farm products, has not abated, although there have been substantial advances in the prices of farm products. Losses of passenger business have continued in spite of all efforts to devise means of stopping them. Agitation for development of inland waterways has become more widespread. An appropriation has been made for the extension of government ownership and operation of the barge service on the Mississippi river system. Political rate making by Congress was threatened in more forms during its last session than ever before and there is serious danger that it actually will be resorted to at the next session. Meantime, when

public attention is called to the fact that, with the exception of railways here and there, the financial results of railway operation are very unsatisfactory, a reference to stock market prices is considered by those who presume to speak for the public as a sufficient answer.

But are these and other conditions and developments that might be mentioned sufficient to justify railway officers in feeling discouraged? We do not think they are. The railways have gone through many ups and downs, especially since effective federal regulation was adopted more than twenty years ago. They failed to get needed advances in rates before the war and a record breaking mileage went into receivership in 1915. They passed through five years of car shortages from 1916 to 1920 and through government operation with its deficits. Their business and earnings became so bad in 1921 that their total net operating income was not sufficient to pay their total fixed charges. They suffered their first nation-wide strike in 1922, and the very general walkout of their shop employees threatened for a while to be extremely disastrous. Senator LaFollette carried on a campaign for government ownership in 1924 in which his most active supporters were railway labor leaders.

It looked repeatedly during these years as if the railroad industry was headed for ruin. And, in fact, it was. It actually would have been ruined if the tendencies which repeatedly prevailed had not been arrested. But they were arrested. In consequence, in each instance the industry pulled through and for a while enjoyed improved earnings.

Why did it pull through? First, financing of the railways during the last twenty years has been extremely conservative. The dividends paid have been relatively small. A relatively large part of the net income earned has been invested in the properties. In consequence, while the percentage of return earned upon investment has not increased satisfactorily, the average number of dollars of net income earned per share of stock has been generally upward. Secondly, capital has been invested and operation has been conducted with increasing skill, in consequence of which the properties are in good condition and economies have been constantly effected. Third, the railways, have struggled against unfavorable tendencies with increasing energy and skill. They have become better organized to present their cases to committees of Congress, to the Interstate Commerce Commission, to arbitration boards and to the public. The educational work done among their employees and the public has been greatly improved in amount, character and effectiveness, which is shown by the betterment in the morale of the employees and in public sentiment.

Experience says it will be necessary to struggle constantly to prevent unfair competition, unfair regulation and the pressure of employees for unreasonable advances in wages from defeating the efforts of the managements to so finance, develop and operate the properties as to enable them to earn a living return. Experience also indicates, however, that if the railways will present a more united front, if they will constantly answer unfair criticisms and combat unfair demands, if they will courageously make the demands in their own behalf that they should make, and if they will spare no reasonable effort to educate employees and the public, and keep them educated, regarding railroad conditions and problems, progress in solving these problems and improving earnings will be made in spite of all the efforts made to prevent it.

There is no real reason at present for discouragement among railway officers regarding their work or the future of the industry. There is much real reason for greater efforts to correct tendencies which, if not corrected, would result in disaster; but we believe those efforts will be made.

Political Rate-Making

THERE will be presented to Congress when it meets in December a question regarding railroad regulation of the most fundamental importance. This is whether railway rates shall be fixed in accordance with economic principles or political pressure—whether they shall be fixed by the Interstate Commerce Commission or by Congress. The test will come when the members of Congress vote on proposed legislation to abolish the "surcharge" on sleeping and parlor car tickets.

The traffic clubs of the country are composed of both shippers and railway officers. The Associated Traffic Clubs of America, at their recent convention, adopted resolutions calling attention to several momentous developments indicating a disposition on the part of Congress to engage directly in rate-making. They mentioned the passage of the Hoch-Smith resolution, the refusal of the Senate to confirm the reappointment of Commissioner John J. Esch because of the way he had voted in a particular case, and the unanimous adoption by the Senate of a resolution requiring the commission to put rates on grain and livestock in the northwest on a par with the rates in Canada, although rates on livestock in this country are actually 20 per cent lower than in Canada. The most imminent threat of political rate-making, however, is presented by the proposed "surcharge" legislation. For several years certain organizations of traveling salesmen have been seeking such legislation. Recently they have been asking for express commitments from members of both houses to vote for it at the next session. They make claims indicating that they have promises of enough votes to pass it.

Passage by Congress of such legislation would be in violation of every principle upon which our present policy of railway regulation is based. It would establish a bad precedent for the following of which there would be constant demands in future. That it would be followed in other cases is indicated by the number of other proposals for direct rate-making by Congress that already have been made.

The Act to Regulate Commerce requires rates to be made just and reasonable. In so making them consideration must be given both to the cost incurred by the railway in rendering service and to its value to those to whom it is rendered. The surcharge enables the railways to get about 10 per cent more revenue for carrying passengers in a sleeping or parlor car than in a day coach. The additional charge is justified by the fact that the cost incurred by the railway in carrying passengers in sleeping and parlor cars is greater than that incurred in carrying them in day coaches, and also because the value of the service to the passengers is greater. Passengers have shown such willingness to pay not only sleeping and parlor car rates, but also the extra charge, rather than ride in day coaches, that while travel in day coaches has steadily declined within recent years, travel in sleeping and parlor cars has increased. Abolition of the surcharge would therefore

violate sound principles of rate-making by depriving the railways of revenues derived from a charge that is based on sound principles.

A second consideration of great importance is that the railways are not now earning on their total business the "fair return" to which they are entitled; that the passenger business of most roads is much less profitable than their freight business, and on many lines is handled at an actual loss; and that abolition of the surcharge would increase the shortage under a fair return and make the passenger business still more unprofitable. Is the surcharge to be abolished entirely regardless of the right of the railways to earn a fair return and the express recognition of that right by the Transportation Act, which was passed by Congress and is still in effect? Or, if the \$40,000,000 of annual revenue derived from it is to be taken away, are advances in freight rates to be made to compensate for it? If so, is Congress going to pass legislation making these advances in freight rates? Or is it going to deprive the railways of revenue to which the Interstate Commerce Commission has held they are entitled, and then leave it to the commission to assume or evade the responsibility of making compensating advances in freight rates?

When it is pointed out to the attorneys and other spokesmen of the commercial travelers' organizations that the railways are not earning a fair return, they reply by calling attention to the prices at which stocks of railways are selling. "By what method of reason", says one of them, "can you reconcile your statement of low earnings with the record of increased market values, which have quadrupled, trebled and practically all doubled within the last seven years?" The answer is, of course, that earnings are only one of the influences by which stock market prices are determined; that, the prices of the stocks of corporations of all kinds have increased much more in proportion within recent years than their net earnings; that the prices of the stocks of railroads have increased much less in proportion than those of industrials and public utilities; and that the place to find out how much the railways are earning is not in the published lists of stock quotations but in the monthly and annual statistics of the Interstate Commerce Commission. These statistics show that the net return earned by the railways thus far this year has been at a lower average rate on either their property investment or their tentative valuation than in any year since 1922, and that for Congress to pass a law to abolish the Pullman surcharge would be for it to reduce the rates of the railways entirely regardless of the fact that they are not earning the return to which they are entitled under the constitution and also under the Transportation Act, which was passed by Congress.

Finally, it has been an accepted principle of regulation ever since the Interstate Commerce Act was passed more than 40 years ago that Congress has neither the time nor the expert knowledge of transportation matters required for the regulation of rates. Congress created the Interstate Commerce Commission to perform this function. The commission originally authorized the collection of the surcharge. It has since upheld it as reasonable. Therefore, for Congress to pass a law abolishing the surcharge would be for it directly to overrule the commission and to fix rates different from those authorized by the commission. Would Congress claim it knows more about the way rates should be made than the commission? If so, why does not it abolish the commission and make all rates? On

the other hand, if Congress is going to maintain the commission and thereby concede that it is better fitted than Congress to make rates, why should Congress stultify itself by setting aside rates that the commission has made?

If Congress passes legislation to abolish the surcharge its action will be due entirely to political influence. It will be an announcement by every senator and representative who votes for the legislation that he doesn't care a tinker's damn about government regulation of railways excepting as a means of getting votes for himself.

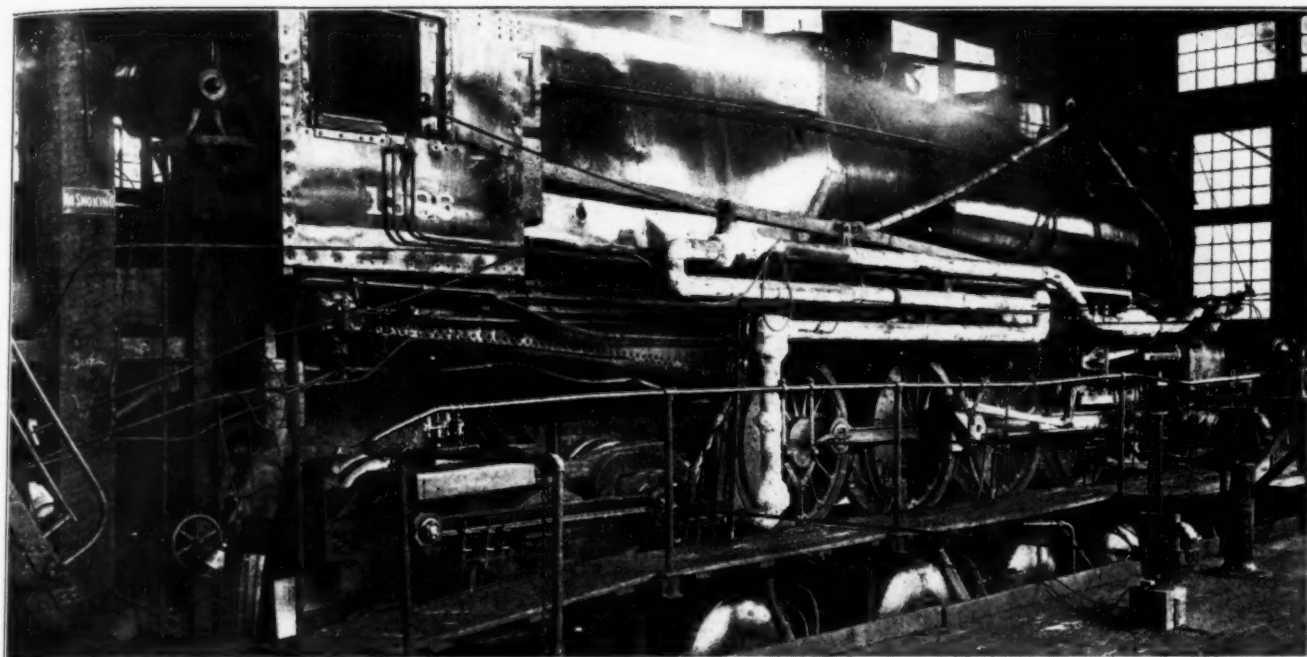
Do the business interests of the country wish to have to present their petitions, evidence and arguments regarding railway rates in future to committees of Congress instead of to the Interstate Commerce Commission? Do business men and farmers want to have the determination of the rates that shall be fixed upon different commodities, and the adjustments of rates as between different communities and territories, left to log-rolling agreements by members of Congress seeking to maintain or improve their political positions? If not, they should actively begin at once to make felt their opposition to the passage of the surcharge legislation being promoted by the commercial travelers' organizations. If farmers and business men want political rate-making by Congress, the passage of the surcharge legislation will be a good way to start it. If they do not want political rate-making, activity on their part resulting in the prevention of this legislation will be the best possible way to prevent it from being begun.

Profit in Multigraphing

SIX years ago an eastern railroad installed a multigraphing machine in its stationery department and last year it added another. Now it develops that the road could pretty nearly afford to throw the machines away every year and buy new ones and still make money, for the saving, after deducting all direct expenses, is upwards of \$7,500 each year.

Every new form which the purchasing department of this road is called upon to furnish is investigated by this little printing department and is produced by multigraphing if it can be done cheaper this way than by commercial printing. The plan is to print not less than 5,000 forms at one time and each order is handled as a separate job. A statement is kept on which is reported, at the completion of the work, the cost of all labor, composition, distribution, printing, cutting and material, and also the cost of supervision, computed on the basis of time required for each job. This statement also gives the printer's estimate for each job and the difference between the printer's and the department's cost. At the end of each month this information is compiled in an itemized statement of all the work done and the cost and savings in each case.

A recent report shows the production of 51 forms during one month, involving 568,000 pieces of paper. Mail bag records, telephone records, personal injury reports, baggage receipts, storage notices, rail failure reports, doctor's certificates, post cards, expense blanks, shipping notices, are typical of these forms. The multigraphs were kept busy, the articles produced were satisfactory, and the cost was approximately \$650 less than if the work had been done outside. It would seem from this experience that there are possibilities of healthy profits for railroads in multigraphing work.



Bethlehem Auxiliary Locomotive under the Rear End of a Pennsylvania Class L1S Locomotive on the Test Plant at Altoona, Pa.

Auxiliary Locomotive Tested on the Plant at Altoona

Develops drawbar pull of 12,022 lb. at 7.3 m.p.h.—Machine efficiency of 89.7 per cent at same speed

DURING July and August of last year, the Bethlehem Steel Company, Bethlehem, Pa., with the co-operation of the Pennsylvania, conducted a series of tests on the Bethlehem auxiliary locomotive at the locomotive testing plant of the Pennsylvania at Altoona, Pa. These tests were conducted with the auxiliary locomotive working alone and also in operation with a locomotive as it is applied in actual service. Owing to the limited length of the testing plant, it was impossible to test the auxiliary locomotive as one of the trucks of a tender. It was, therefore, applied in place of the trailer truck to a 2-8-2 type locomotive (Pennsylvania class L1s). The steam supply pipe to the auxiliary locomotive was connected to both branch pipes of the locomotive. The usual number of bends and Barco joints were placed in the steam line to give the same length of pipe and resistance to steam flow, as if the auxiliary locomotive were placed in its normal location under the tender. The gears were blocked in mesh. The weight supported by the auxiliary locomotive was not ascertained, but it was sufficient to prevent slipping of the wheels.

The first tests were made for the purpose of comparing the results obtained with the locomotive working alone, and when assisted by the auxiliary locomotive. These preliminary tests were made at speeds of 40, 50 and 60 r.p.m., which correspond to 7.3, 9.2 and 11 m.p.h., respectively.

Full gear tests of the locomotive and at 80 per cent cut-off were made at all three speeds, while tests at 60

and 70 per cent cut-off were made at speeds of 7.3 m.p.h. and 11 m.p.h. Special tests of the locomotive alone were made to show the change in drawbar pull at 7.3 and 11 m.p.h. with various changes in cut-off. Tests were also made to determine the steaming capacity of the locomotive. In addition, a series of tests of the auxiliary locomotive were made to determine its characteristics when operated alone. In some instances, when the boiler pressure could not be maintained, or the results did not seem consistent, a duplicate test was run.

Method of Conducting the Tests

All of the tests, except those conducted on the auxiliary locomotive when working alone, were made in pairs. In other words, a test of the locomotive and the auxiliary locomotive was followed by a test of the locomotive alone, the test of the locomotive alone starting as soon after the auxiliary locomotive was stopped as the firing rate, rate of boiler feed, branch pipe temperature, etc., became adjusted to the new test conditions. The locomotive and auxiliary, when operated together, were run at the same speed in miles per hour. Tests of the auxiliary locomotive alone were made at speeds lower than when it was operated with the locomotive. Starting tests were not attempted either with the locomotive or auxiliary locomotive on account of the danger of slipping.

The driving wheels of the locomotive were 62 in. in diameter and that of the auxiliary locomotive driving wheels, 36 in. The gear ratio of the auxiliary locomotive

used in these tests was 2.25. The locomotive was hand fired with run-of-mine, bituminous coal.

Steaming of the Locomotive

A test was made on the locomotive alone at 160 r.p.m. and 65 per cent cut off, to determine if it was steaming

locomotive, the demand for steam exceeds the ability of the boiler to supply it, with the draft available, except at the lower speeds. The available draft can be augmented to some extent by the use of the blower, but not sufficiently to obtain the maximum evaporative capacity of the boiler at low speeds.

Boiler Pressures

A boiler pressure of 200 lb. or above was maintained in all of the tests of the locomotive when operated alone. When the auxiliary locomotive was used in combination with the locomotive, the steam pressure could be maintained up to an equivalent evaporation of 50,000 lb. per hour. Beyond this evaporation rate, the use of the blower was necessary. It was seen that the application of a stoker would in no way increase the steaming capacity of the boiler for the conditions under which the auxiliary locomotive was operated, but it would ma-

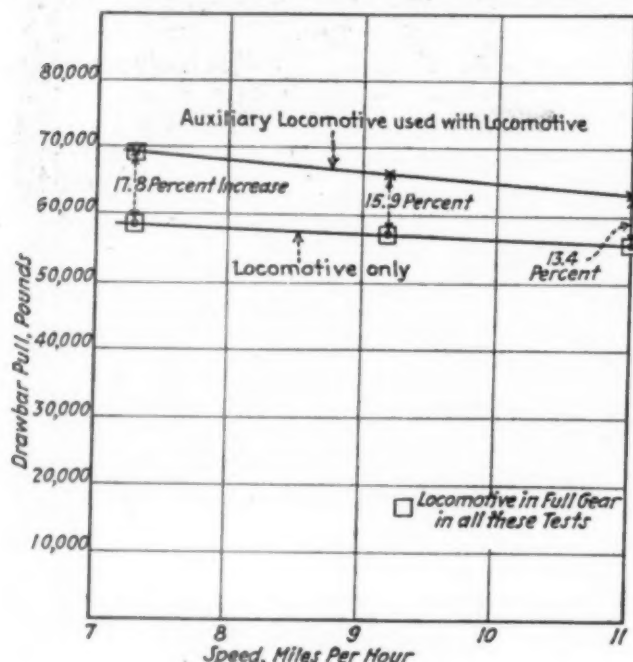


Fig. 1—Maximum Drawbar Pulls

freely and if it would develop as high evaporation as had been found in other class L1s locomotives. No difficulty was found in maintaining a steam pressure of over 200 lb. with an evaporation rate of 61,841 lb. per hour, (81,917 lb. equivalent evaporation) a combustion

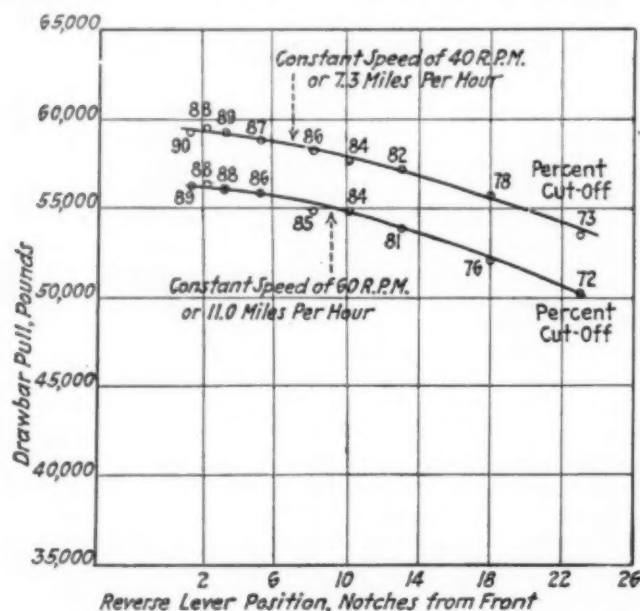


Fig. 2—Drawbar Pull of the Locomotive as Affected by Cut-off Adjustment with Constant Speed

rate of 12,662 lb. of coal per hour and a steam temperature of 621 deg. F. However, in obtaining this maximum evaporation, the auxiliary locomotive was not used and all the steam was exhausted through the nozzle and utilized in producing draft. When operating the locomotive at long cut-offs, in conjunction with the auxiliary

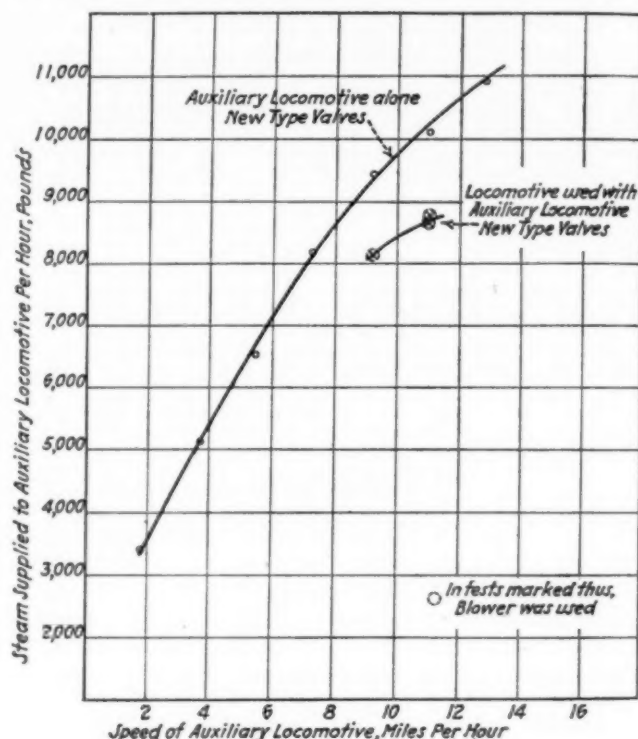


Fig. 3—Steam Consumption of the Auxiliary Locomotive

terially assist in sustaining these results under road operating conditions. It would eliminate the human factor. Also the firing rates attained represent rates beyond the capacity for road hand firing.

Drawbar Pull

The auxiliary locomotive adds to the drawbar pull, but does so at a lowered efficiency of the whole unit. In full gear at 7.3 m.p.h., the locomotive alone has an efficiency of 4.9 per cent. When working in full gear in combination with the auxiliary locomotive, the efficiency of the unit falls to 3.1 per cent. The drawbar pull under these working conditions is increased 10,442 lb., or 18 per cent, and the efficiency is decreased 37 per cent.

The drawbar pulls of the locomotive alone and the locomotive and auxiliary locomotive used together are shown in one of the tables. At 7.3 m.p.h., it was possible to operate the locomotive in full gear and also the auxiliary locomotive, giving a combined drawbar pull of 69,111 lb. The locomotive blower was required in this test to maintain boiler pressure.

No full gear tests with the auxiliary locomotive in service were made at speeds above 7.3 m.p.h. As full boiler pressure was maintained in the test in full gear at 7.3 m.p.h. with the auxiliary locomotive, it is probable that the locomotive could have been worked in full gear, with the auxiliary in use, at a slightly higher speed.

When operated together, the drawbar pull is less than the sum of the drawbar pulls at each individual unit, under the same test conditions, owing to the

Drawbar Pull in Pounds of the Locomotive and the Auxiliary Locomotive Working Alone and in Combination

Speed m.p.h.	Locomotive alone	Locomotive with auxiliary locomotive	Difference between locomotive with auxiliary and locomotive alone	Cut-off of locomotive per cent Full gear
7.3	58,669	69,111	10,442	80
7.3	56,425	68,615	12,190	80
9.2	55,740	66,184	10,444	80
11.0	53,838	63,433	9,595	80
7.3	51,679	63,121	11,442	70
7.3	47,244	57,689	10,445	60

greater drop in steam chest pressure. This difference increases as the speed increases. The minimum speed at which the locomotive was run in these tests was 40 r.p.m., or 7.3 m.p.h. and it is probable that at lower speeds the total drawbar pull would approach the sum of the drawbar pulls of the two units and very nearly equal it at starting speeds.

The Drawbar Pull Above the

Maximum of Locomotive

While the foregoing shows the increase in drawbar pull due to the auxiliary locomotive, for various test

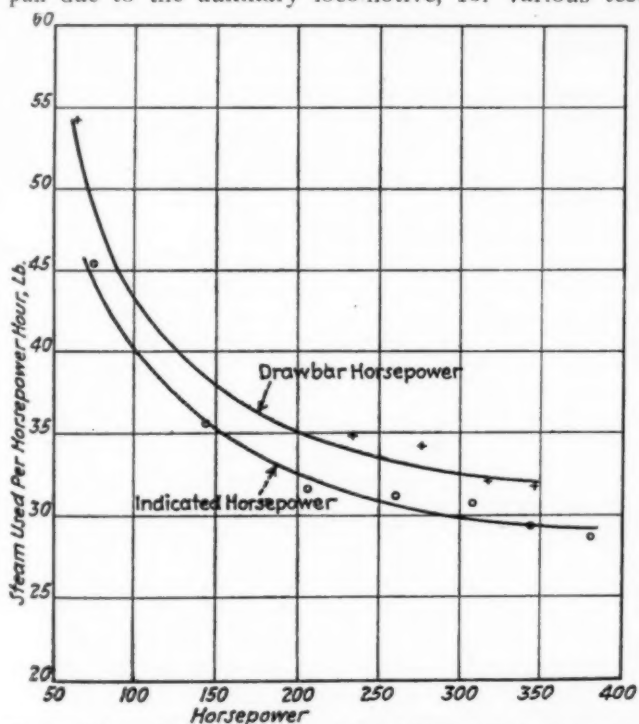


Fig. 4—Steam Used Per Indicated and Drawbar Horsepower by the Auxiliary Locomotive

conditions, it does not show either the maximum pull of the locomotive alone, or the net increase due to the auxiliary locomotive, except at the lower speed of 7.3 m.p.h.

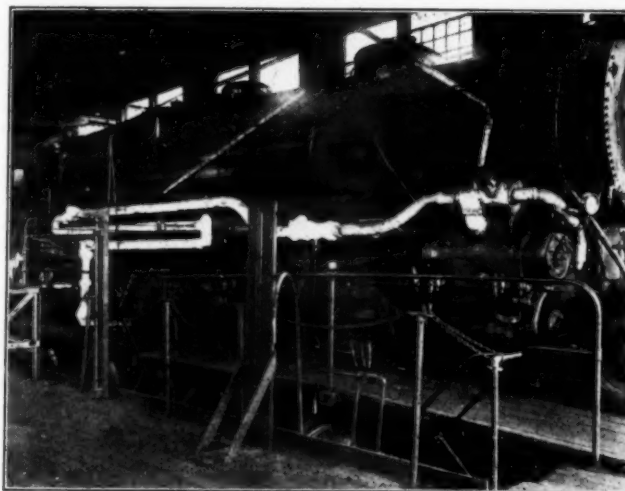
Tests of a class L1s locomotive, as recorded in Pennsylvania Bulletin 28, show maximum pulls at other speeds and tests were made of locomotive No. 1306 to confirm the results shown in that bulletin. These are tests No. 8249 at 50 r.p.m. (9.2 m.p.h.) and full gear

cut-off, and No. 8250 at 60 r.p.m. (11.0 m.p.h.) and full gear. The drawbar pulls obtained are shown in one of the tables, which also shows the net increase in pull, due to the auxiliary locomotive.

Net Increase in Drawbar Pull due to the Auxiliary

Speed m.p.h.	Locomotive		Net increase in pull due to auxiliary locomotive	
	Maximum drawbar pull, lb. Locomotive alone	Locomotive and auxiliary loco.	Lb.	Per cent
7.3	58,669	69,111	10,442	17.8
9.2	57,084	66,184	9,100	15.9
11.0	55,964	63,433	7,469	13.4

The pulls of 66,184 lb. and 63,433 lb. at 9.2 and 11.0 m.p.h. were not made with the locomotive in full gear, but at 80 per cent cut-off. It may be that a slightly greater pull is possible at 9.2 m.p.h. In this test, while the blower was used, the boiler pressure was easily



Arrangement of Steam Pipes to the Auxiliary Locomotive

maintained. The pull at 11.0 m.p.h. is a maximum as, in this test, the blower was used and the pressure was not fully maintained throughout the test.

In the plotted results shown on Fig. 1, the drawbar pull of the locomotive and auxiliary at 9.2 m.p.h., falls on the curve and it is believed that the net increase shown is the maximum obtainable not only for 7.3 m.p.h., but also for 9.2 and 11.0 m.p.h.

Tests at Long Cut-off

In addition to the tests of the locomotive at 60, 70 and 80 per cent and full gear cut-off, it was desired to determine the effect on the drawbar pull when the cut-off was decreased by small increments from full gear, the speed remaining constant. This was done for two speeds, 40 and 60 r.p.m., or 7.3 and 11.0 m.p.h.

The principal data obtained in these tests is shown in Fig. 2. The cut-offs were about evenly spaced, in nine notches, between 70 per cent and full gear. The drawbar pull falls off as the cut-off is shortened. At 70 per cent cut-off, it is about 10 per cent less than in full gear and at 80 per cent cut-off. It is four per cent less for both speeds.

The steam per indicated horsepower-hour was not measured in these tests, as the time of running, in each cut-off, was not long enough. This figure has been calculated from the heat apparently utilized in the cylinders, the quantity of heat being derived from the live and exhaust steam pressures and temperatures.

Steam Economy of the Auxiliary Locomotive

The auxiliary locomotive uses steam at rates of between 3,400 and 11,000 lb. per hr., when operating between about 2 m.p.h. and 13 m.p.h. The steam used

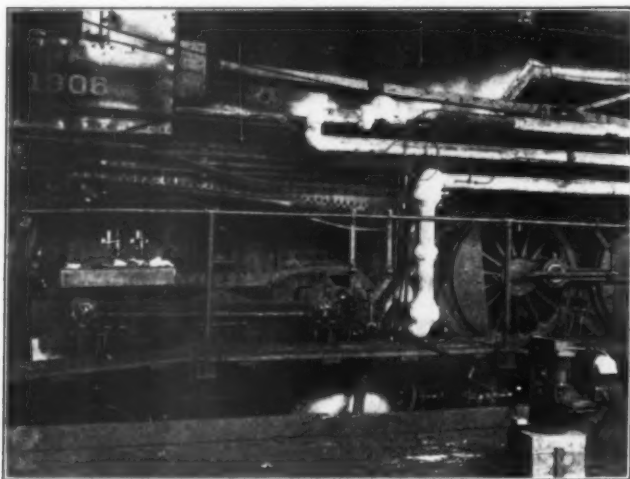
per indicated horsepower-hour is from 45.5 lb. at 1.8 m.p.h. to 28.7 lb. at 12.8 m.p.h. The indicated horsepower of the auxiliary locomotive was from 75 at 1.8 m.p.h. to 382 at 12.8 m.p.h.

The drawbar horsepower, steam economy (see Figs. 3 and 4) and machine efficiency of the auxiliary are shown in the table. The machine efficiency ranged between 84 and 92 per cent.

Results of Tests of the Auxiliary Locomotive Operating Alone

Test No.	Duration of test, min.	Speed m.p.h.	Drawbar horsepower	Steam supplied per d. hp. hr. lb.	Drawbar pull, lb.	Machine efficiency, per cent
8241	10	1.8	63	54.2	13,083	84.0
8238	8	3.7	130	39.5	13,207	90.3
8237	10	5.5	185	35.4	12,617	89.4
8236	10	7.3	234	34.9	12,022	89.7
8235	10	9.2	276	34.2	11,222	89.6
8239	10	11.0	316	32.1	10,760	91.9
8240	10	12.8	345	31.8	10,093	90.3

At a speed of 7.3 m.p.h., the machine efficiency of the locomotive in full gear cut-off is 9.3 per cent and



Throttle Valve and Indicators Used During the Test

that of the auxiliary locomotive at this speed, as shown in the table, is 89.7 per cent.

Grade Resistance of the Auxiliary Locomotive

This auxiliary locomotive, when applied to the tender of the class L1s locomotive, is installed in place of a truck weighing 10,930 lb. As the auxiliary locomotive weighs 31,500 lb., the net weight added is 20,570 lb., or 10 tons. The locomotive and tender, without the auxiliary locomotive, weighs 250 tons and with the auxiliary locomotive, 260 tons. The maximum drawbar pull of the locomotive alone is 58,669 lb. at 7.3 m.p.h. on a level track. Under these conditions of level track, the auxiliary locomotive adds to the drawbar pull 10,442 lb., or 17.8 per cent of the pull of the locomotive alone. Taking 20 lb. per ton as the grade resistance, we find that, on a three per cent grade, the locomotive pull will be 43,669 lb. and the pull added by the auxiliary locomotive, 9,842 lb. or 22.5 per cent. The pull added by the auxiliary locomotive is a larger proportion of the total pull when operating on grades.

"THE SCHOOL ON WHEELS" which has been operated during the past year by the Ontario Department of Education, furnishing elementary education for children in remote districts unprovided with regular schools, has proved so successful that the Canadian Pacific has furnished a second car for the same purpose. The new car is now in use west of Port Arthur.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended September 15 amounted to 1,138,312 cars, an increase of 147,270 cars over the preceding week when observance of the Labor Day holiday reduced the total, and an increase of 10,669 cars as compared with the corresponding week of last year. Loading of live stock, ore and miscellaneous freight was larger than a year ago. Led by forest products, the loading of other commodities showed small decreases. Loading in all districts, excepting the Southern and Pocahontas, was larger than in the corresponding week of last year. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Districts	1928 Week ended Saturday, September 15, 1928	1927 Week ended Saturday, September 15, 1927	1926 Week ended Saturday, September 15, 1926
Eastern	254,739	247,191	265,774
Allegheny	231,661	224,912	241,239
Pocahontas	61,710	64,663	61,797
Southern	151,549	165,909	166,241
Northwestern	176,947	175,733	185,827
Central Western	169,830	161,926	169,758
Southwestern	91,876	87,309	88,623
Total West. Dist.	438,653	424,968	444,208
Total All Roads	1,138,312	1,127,643	1,179,259
Commodities			
Grain and Grain Products	57,014	60,655	49,577
Live Stock	34,336	31,765	39,543
Coal	180,678	182,811	206,078
Coke	9,732	9,742	12,396
Forest Products	65,511	69,278	73,059
Ore	63,930	56,511	77,809
Mdse. L.C.L.	266,713	268,550	269,382
Miscellaneous	460,398	448,331	451,415
September 15	1,138,312	1,127,643	1,179,259
September 8	991,042	989,799	1,024,998
September 1	1,116,948	1,117,360	1,143,448
August 25	1,080,840	1,109,341	1,128,563
August 18	1,056,905	1,066,828	1,081,503
Cumulative totals, 37 wks.	35,877,147	36,919,449	37,217,173

The freight car surplus during the period ended September 8 averaged 188,795 cars, as compared with 201,864 cars on August 31. The total included 99,915 box cars, 48,697 coal cars, 17,910 stock cars and 12,888 refrigerator cars.

Canadian Car Loadings

Revenue car loadings at stations in Canada for the week ended September 15 totalled 88,086 cars, an increase over the previous week, which contained a holiday, of 14,267 cars, and an increase over the same week of last year of 17,684 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
Sept. 15, 1928	88,086	40,017
Sept. 8, 1928	73,819	36,876
Sept. 1, 1928	73,643	41,220
Sept. 17, 1927	70,402	37,029
Cumulative Totals for Canada		
Sept. 15, 1928	2,442,733	1,443,264
Sept. 17, 1927	2,262,074	1,395,151
Sept. 18, 1926	2,159,226	1,375,942

* * *



Photograph by Hoag & Ford, Los Angeles.

The Repair Shops of the Southern Pacific of Mexico at Empalme, Sonora

Railway Shop Foremen Diagnose Material Problems

*Confer with supply officers
on ways and means of
operating on smaller
inventories*

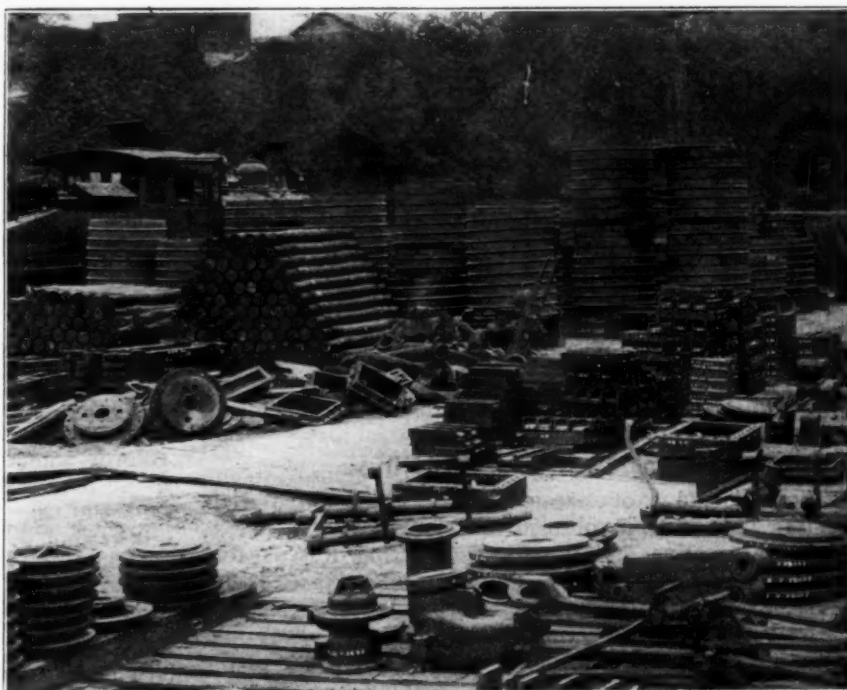
COMMITTED to the proposition that harmonious co-operation with their supply organizations in saving the carriers from ill-advised and excessive expenditures for materials and supplies is a pressing want in railway shop management, the International Railway General Foremen's Association devoted a considerable portion of its annual meeting in Chicago last week to a study of ways and means of meeting the new conditions. The session on material was featured by an address by U. K. Hall, general supervisor of stores, Union Pacific Lines, and by the attendance of other stores officers.

Stores Association Asks Cooperation

Mr. Hall, a past president of the Railway Purchases and Stores Association, revived the picture of the large outlay of capital tied up in unapplied material on railroads and appealed to the repair forces to co-operate more fully with the custodians of the material in controlling and improving the situation. R. J. Farrington, general foreman, P. & L. E., declared that there is probably more friction over the material question than any other single point of difference in railroad shops, and agreed that with a better understanding of the material problem, car and shop supervisors should be able to co-operate better with the stores department, citing, as an example of this, the practice on the P. & L. E. of stationing a storekeeper's clerk in the motive power department to follow all orders for material and watch the rate of its consumption, and keeping a mechanical department representative in the stores department to check all orders issued for material from outside points and to determine if substitutions can be made to meet needs without buying new material.

Enlarged Responsibility Recognized

In a special report prepared by George T. Boone, general shop foreman, C.N., the association recognized the enlarged responsibility of general foremen for greater care in ordering material, particularly material to be placed in stock for new power and equipment, and also for assisting in the disposal of obsolete and inactive



An Accumulation of Unapplied Locomotive Materials

supplies. In the same report the association advocated the preparation by repair forces of better material lists in connection with new power. O. Nelson, general storekeeper, U. P., stressed the necessity of the supply officer having the confidence of the men in the shop in order to serve them efficiently without waste to the company, while W. S. Morehead, assistant general storekeeper, I.C., laid emphasis upon a close and continuous personal contact between supervisors of repair forces and supply officers as the indispensable factor to efficient or economical supply service and control, and declared that one of the great weaknesses of customary relationships between the two departments is the persistent habit of store forces and repair forces alike to write letters instead of ironing out differences over the conference table. Others participating in the discussion include H. E. Warner, superintendent of shops, N.Y.C., who cited from his own experience to illustrate how effective an interest in material on the part of mechanical supervisors can be in reducing the volume of unapplied material. C. R. Davis, erecting foreman, H.V., agreed that with the modern locomotive and the improvements in design and materials, the requirements in stock should not be as extensive as in the past, and advocated as one means of avoiding inactive stock more caution on the part of shop foremen in ordering repair parts for new equipment until tests had determined the scope of alterations to be made. F. Lamond, C. & N. W., recommended that more attention be given in shops to impressing the money value of material upon mechanics using or handling it, and stated that the presence of the storekeeper at all weekly meetings of shop foremen on the North Western to discuss specific delays to material and consider work under way or in immediate

prospect has proved extremely beneficial in avoiding accumulations of unused stock. The remarks of Mr. Hall and others are presented in more detail below.

The Customer's Interest in the Unapplied Material

By U. K. Hall

General Supervisor of Stores, Union Pacific System

There has never been a time that called for more conservative ordering of railway materials than the present. During 1927 the value of purchases for all railroads was \$1,396,000,000, and the average investment represented in the materials and supplies carried in stock is over a half million dollars. Considering all the factors, such as the interest on investment, taxes, deterioration, waste, obsolescence and handling, it is costing the railroads from 15 to 20 per cent of this investment to carry these materials in stock. These facts are becoming more generally known, and as a consequence more attention is being given to the subject. Over-investment or needless investment in railway materials must be scrupulously avoided.

Too Much Over-Ordering

Any mistake or over-zealousness in ordering materials results inevitably in obsolete or slow-moving supplies, and conservative and intelligent ordering lessens that much the possibility of charging operating expenses with the cost of materials bought but not used.

It is commonly thought that the users of railway materials should assume the responsibility for ordering the repair parts necessary for any new equipment or devices, after which the stores department, by the use of stock books and stock records, are expected to make the replacements. It is my opinion, however, that the department using the equipment and the stores department should co-operate to order only such materials as past experience may indicate are actually necessary. On the arrival of new equipment or devices, a careful check should be made of any repair parts of a special nature likely to be required and a list prepared which should be studied by both users of the material and the stores department to arrive at a conservative quantity of such parts to keep in readiness for use. To order four or six parts or items when one or two would offer sufficient protection is obviously an unnecessary expense.

The stores department can also be beneficial by calling attention to parts which it feels are ordered in excess. Through its custody of stocks, that department knows in a general way what materials are necessary and what might not be necessary, and thus can usually co-operate effectively with the using department in confining these lists of supplies to actual necessities.

There have been instances in connection with the installation of new power where the lists furnished the stores department, giving the materials to be carried in stock to protect that power, led to the ordering of items which were found to be on hand years afterward. The extended use of oxyacetylene and electric welding dispenses with the necessity of stocking many items once carried, but aside from this the utmost consideration should always be given to ordering the large and solid parts such as engine frames, cylinders, wheel centers, deck plates, etc. Users should also differentiate between shop-made materials and purchase materials, as the former can usually be produced promptly.

It must be realized that the responsibility for materials is not only that of having the necessary materials on hand, but also for having them on hand when not necessary. Sometimes the feeling has prevailed that as long as material is in store stock and not delivered for use, no

harm has been done. On the contrary, the damage has been done when the material is ordered and paid for, irrespective as to whether or not it is in store stock. The money has been spent, even though it is not charged to the user's operating expenses. This phase of the supply situation cannot be emphasized too strongly. If users knew that all material ordered on special requisitions or letters was to be charged direct to the operating expenses upon its receipt, they would not order material so freely. Departmental lines must be forgotten in meeting the problem and all concerned thoroughly understand that the only time to bring about economies in material is before they are purchased.

Reduce Slow-Moving Stock

The problem created by the existence of slow-moving materials is difficult to control. There are on all roads many items of material in stock which are not obsolete, but are required for the upkeep of equipment that is fast becoming obsolete. Such materials should not all be scrapped as long as there is a possibility that such equipment may be used in times of increased tonnage or business. To reduce the cost of such materials to a minimum a carefully prepared list, based on stock book records, should be prepared, showing the exact movement of such materials, and this list should be furnished to both the using and the stores departments. Also, such stocks should, as far as practicable, be concentrated at a specially designated point, usually at the general store.

If such a list is not prepared or the material consolidated, there is always a possibility of some outlying point ordering materials while a surplus of such stocks exists at another store. If the power is restricted to a certain division or locality, such slow-moving materials should be consolidated at this point only. While there are large numbers of items that cannot be used for any other purpose, there are also times when by the use of a carefully prepared list, materials of one kind can, by machining or slight alterations, be substituted economically for other material, thus releasing slow-moving material and saving the unnecessary expense of an additional purchase. If all concerned realize the joint responsibility for such stocks, the problem is in a fair way to solution. If not, the situation is hard to handle.

Change Obsolete Material to Money

Any efficient stores department, by the use of modern and well kept stock books, is in a position at any time to prepare a list of obsolete as well as slow-moving materials, and this should be done constantly. The stores department should prepare the list and be able to depend upon the using departments for advice as to the disposition of the material. Both departments should be liberal enough, irrespective as to whether they ordered the material or not, to realize the advisability of disposing of it. Lists prepared by the stores department should contain the complete description of the material, the equipment for which it was ordered, and the value. Then, at opportune times, as when earnings are at their best, every available opportunity should be taken to transfer the charge for such items from the store accounts into operating expenses, and dispose of the materials to the best advantage.

On some roads this is handled efficiently by a standing committee. When lists of slow-moving materials are submitted, this committee, representing the using departments and the stores department, checks carefully all items, looking first for opportunities to make substitutions for other materials, and second, recommending its disposal by scrapping or sale.

There is no longer anything to be gained by holding such materials in stock. The old-time railroad man had the idea that materials once on hand should be held for

possible use, overlooking the fact that it was costing the company to carry them, while by their disposal they can be converted into money.

The Solution of Inactive Material

By George T. Boone

General Shop Foreman, Canadian National

The general impression seems to exist that mechanical supervisors are not giving the proper consideration to the importance of material values and material conservation. If this impression is correct, it is the result no doubt, of the constant demand upon them to solve problems pertaining to other important matters, such as quality and quantity of production, economy of operation, payroll allotments, safety, first aid, fire prevention measures, etc.

In designing modern equipment, the cost of maintenance must receive consideration. Any attempt on the part of manufacturers to introduce devices that entail a high maintenance cost usually fails, but after the best engineering standards are used and exhaustive tests made, it is still impossible to obtain perfection and some maintenance is necessary and must be provided for before the equipment has been put in service. The equipment for which repair parts are likely to be required, includes such appliances as feedwater heaters, boosters,

is also advisable to carry spare unit parts at some terminals for replacements, instead of attempting repairs where proper facilities are not available.

It will prove a convenience for material issuers if a minimum stock list is provided for such supplies. Repair parts required for general repair should be ordered in advance by the mechanical officer in charge of the equipment while in service. This system is practical so long as an allowance is made for overlooking minor parts and for severe weather conditions. It has been suggested that the initial stock of repair parts be considered as part of the equipment and charged to the capital account.

Obsolete material should be disposed of immediately for the greatest possible value. Better methods governing the application of standards will help to keep materials from becoming obsolete. Standards should not be revised unless the safety, economy, or improvement in service is sufficient to justify retiring all material in stock that will immediately become obsolete as a result of the proposed change.

The problem of slow-moving material can be minimized but not entirely overcome in repair work. One of the principal causes for slow-moving material is the general practice of permitting stock issuers to base the future requirements on previous issues, without first consulting with the department using the material.



Inactive Car Materials Are Frozen Assets and Should be Avoided

stokers, mechanical lubricators, steam control regulators, automatic train control and the usual electric and pneumatic devices. Only the parts subject to wear and breakage, such as valves, valve seats, valve discs, cylinder and rod packing, gaskets, springs, bearings, pinions, special pipe connectors, connecting pins, bushings, contact points, carbons, electric bulbs, thermo couples and indicator charts should be considered as an initial stock requirement. To determine these parts, a knowledge of the equipment is necessary, and it is not reasonable to expect storekeepers to be responsible for this service.

The manufacturers of railway equipment are specialists, and when manufacturing new or improving old equipment, take advantage of every opportunity to use standard parts to economize in the cost of production. This should be carefully considered when ordering repair parts for new equipment, as very often numbers of repair parts already on hand are interchangeable with the parts required.

Expensive repair parts should be stocked at general repair stations or at central points and shipped only on special authority; minor parts should be stocked at engine terminals in proportion to the equipment assigned. The source of supply must be considered, especially in the case of parts that cannot be substituted. It

Another cause of slow-moving material is the practice of storekeepers or foremen at outside points of ordering large quantities of material during a temporary rush, which, while ordered with the best of intentions, are not required and eventually must be returned to the main stores as surplus and added to the slow-moving stock. Manufacturing material in quantities for local requirements is also the frequent cause of slow-moving material. In such instances the storekeeper often acts in good faith and the responsibility rests with the department requesting the material to be manufactured.

Retiring equipment that is no longer serviceable, or rebuilding serviceable equipment, is also very often the cause of large quantities of material being accumulated which, while not obsolete, are not likely to be required except to meet possible emergencies with equipment that has not been rebuilt. This problem is sometimes hard to solve, as it is hardly advisable to scrap serviceable parts and later manufacture new ones; on the other hand, it is not economy to delay scrapping parts that are not likely to be used.

Various methods have been suggested to regulate the handling of slow-moving material, three among which invite special consideration; (1) All slow-moving ma-

material with an average issue of one piece only each three months should be reduced to a stock of one piece; (2) slow-moving material should be checked or painted with a special mark annually, and all parts carrying previous annual markings should be scrapped; (3) all slow-moving material should be centralized, classified on surplus stock lists and reduced only after the personal inspection and instructions of the proper officers.

The disposal of slow-moving material can be accomplished in many ways without seriously affecting the value of the stock. Slow-moving bolts should be cut to more suitable lengths and re-threaded, driving springs stripped and plates used for other springs having the same size steel; bar iron rolled to smaller sizes, or, if suitable, used for forged bolts or turret lathe work where the surplus stock can be removed at very little extra expense and the loss in weight is justified. Slow-moving carbon or high speed steel can be used for smaller sizes in preference to maintaining a variety of stock where the small demand does not warrant having the exact size in every case. This also applies to driving and engine truck axles, billets, plates, etc. In one case a quantity of surplus tubing for superheater units was used for constructing water pipe lines as a result of welding.

The improved methods of manufacturing and transporting material, together with tariff and trade agreements, have brought about many changes that have effected a saving in the handling of railway material, but there are still many opportunities for further improvements, such as centralizing supply basis and extending the interchange of standard parts by companies using the same or similar equipment.

In dealing with problems affecting material it is well to remember that the less money there is tied up in stores stock the more there will be available for solving labor problems, payroll allotments, and improving working conditions.

Western Roads Propose Immediate Rate Increase

WASHINGTON, D. C.

PREPARATORY to the filing of increased rates on numerous commodities in western trunk line territory, a petition submitted on behalf of the carriers requests the Interstate Commerce Commission to vacate or amend all outstanding orders that would interfere with an increase in rates, and to authorize, in view of the present emergency, the filing of blanket supplements to existing tariffs, in order that the carriers' proposals may be presented to the Commission without delay and with a minimum of expense.

The petition was made public by the Commission September 21. It is dated August 1 and signed by E. B. Boyd, chairman of the Western Trunk Line Committee; C. W. Galligan, chairman of the Illinois Freight Association; and H. G. Toll, chairman of the Trans-Continental Freight Bureau. The petition declares that increased rates should take effect as soon as possible because of the large increases in operating expenses that have been imposed on the western trunk lines.

No specific proposals for increases in rates were submitted with the petition to the Commission. The tariff publishing agents stated that the present intentions of the carriers may be modified somewhat by information developed at the public hearings to be held upon receipt from the Commission of the authorizations sought. In

support of the carriers' program for an immediate upward revision in rates, the petition states:

"The revenues of the Western Trunk Lines, individually and collectively, for some years have been and now are conspicuously inadequate. In 1927 those class I carriers having more than 75 per cent of their mileage in Western Trunk Line territory earned only 3.45 per cent on their property investment, and in the case of some of the larger lines the property investment accounts are less than the valuation placed upon the property by the Commission. Eliminating the Union Pacific, because of the fact that it does not extend east of the Missouri river, and thus is not a representative Western trunk line, and also because its accounts include earnings from system lines not touching Western trunk line territory, it develops that the remainder of the lines in Western trunk line territory having 90 per cent of their mileage therein earned on their property investment in 1927 only 2.97 per cent. In Docket No. 17,000, Part 2, the inadequate revenues during the period subsequent to federal control of the lines having the bulk of their mileage in Western trunk line territory and the inadequacy of the rates in that territory were brought to the attention of the Commission. The situation was recognized by the Commission in *Revenues in Western District*, more commonly known as Ex Parte 87, 113 I. C. C. 3, 29, where the Commission said:

"* * * a study of the above table and of other evidence of record tends to show that rates in western trunk-line territory generally are on a materially lower level than rates in other sections of western territory, including the southwest."

"In Ex Parte 87 the Western trunk lines developed the fact that the basis of rates requested in that proceeding does not meet the revenue requirements of these carriers, and that additional increases in rates would be required.

"Since the hearing in Ex Parte 87 material increases in operating expenses have been imposed upon the carriers in Western trunk line territory because of increased wages resulting from arbitrations conducted under appropriate federal legislation. The Western lines have felt that they were and are in no position to bear increased expenses of this character, and have opposed them vigorously, but nevertheless have been required to assume additional burdens in this regard amounting to many millions of dollars.

"Because the revenues of the lines in Western trunk line territory have been inadequate ever since these properties were returned to their owners after Federal control, and because operating expenses have been increased by forces beyond the control of the carriers, it has become imperative that these lines without delay bring to the Commission constructive proposals looking toward increases in existing rates and revenues. The outstanding orders listed in Appendix A, and such other orders of a similar character as may exist, appear to be an obstacle to this program, since the filing of schedules, including rates and rules, contrary to the requirements of said orders could be regarded as a violation of the act. In these circumstances, it seems necessary that the Commission vacate or amend these outstanding orders in such a manner as to prevent their operating to interfere with the carriers' lawfully publishing increases in existing rates. There is ample authority for such action, since this was the procedure adopted by the Commission in connection with General Order 28 and Ex Parte 74.

"This would in no way prejudice the rights of the public or the interests of shippers, since the Commission under its power of suspension and investigation can, in appropriate cases, require justification of the increased rates before they become effective. This authority should be granted not only for account of the Western trunk lines but for all lines, since where there will be an increase on certain specific commodities in cents per 100 pounds there must be a similar increase interterritorially, and where rates are increased on a percentage basis it is necessary in many instances to increase interterritorial rates relatively with the increase within Illinois Freight Committee territory and Western trunk line territory, to the end that commercial relationships may be maintained as near as may be. That the Commission has recognized the propriety of such changes is indicated by the fact that these authorities were granted to the Eastern lines in connection with the 15 per cent increase in that territory.

"There is an urgent need that the Commission permit the proposals of the lines to be presented to it in the form of blanket supplements to existing tariffs, and the Commission has permitted this to be done under similar circumstances. Where an emergency exists, as here, proposals for increased rates should reach the Commission without delay. The increased rates should take effect as early as conditions may warrant, and the entire proposal of the carriers should be submitted in a manner that will result in the expenditure of the least time and money."

Loree Directorship Order Revoked

*I. C. C. cancels its authorization permitting him to act
as a director of the M-K-T*

THE Interstate Commerce Commission on September 21 made public a supplemental order dated September 14 setting aside that portion of its order of April 11, 1925, which had authorized L. F. Loree to hold the position of director of the Missouri-Kansas-Texas, in addition to positions as officer or director of other railroads.

Without assigning specific reasons for its action the Commission stated at the end of a report reviewing transactions in connection with the proposed unification of the Missouri-Kansas-Texas, the Kansas City Southern and the St. Louis Southwestern that "In the light of the above facts, we are unable to find that the holding by Loree of the position of director of the Missouri-Kansas-Texas, would not adversely affect public or private interests." Among facts recited are included details of transactions by which Mr. Loree is said to have made a personal profit of \$144,708 from the sale of 14,000 shares of Missouri-Kansas-Texas stock purchased in connection with Kuhn, Loeb & Company and associates, while he was chairman of a special committee of the K. C. S. appointed to consider the possibilities of consolidation with other Southwestern roads. There are also included details of purchases of M-K-T stock by the K. C. S. and of its subsequent sales, largely to bankers, of its M-K-T stock which Mr. Loree had represented on the board.

Commissioner Aitchison, concurring, said he regarded the discussion of Mr. Loree's stock transactions as irrelevant and unnecessary. Commissioner Porter, concurring, said he believed the decision should have been postponed and the case determined with the pending cases involving the unification. Commissioner Brainerd dissented, saying the report does not make clear what, if anything, that has happened since the former order that now requires its withdrawal, and that the action tends to prejudice the issues before the Commission.

The report says in part:

At the time Loree filed his application for authority to serve as a director of the Missouri-Kansas-Texas he was chairman of the board of directors of the Kansas City Southern and the latter company had acquired 250,000 shares of the capital stock of the former. The desire of the owner of this large stock interest to be represented on the board of directors of the Missouri-Kansas-Texas was, of course, a factor which was before Division 4 for consideration upon Loree's application, as was the fact that there appeared to be competition between those carriers particularly on traffic moving between Kansas City, Mo., and points in Texas.

The testimony shows that following the passage of the transportation act in 1920, the officers and directors of the Kansas City Southern commenced a study of traffic relations in the Southwest and of the possibilities of consolidations, and a special committee was appointed to consider the matter, with Loree as chairman. The conclusion was reached that the Kansas City Southern should consider the acquisition of control of other roads to be grouped into a system with the Kansas City Southern. About the middle of October, 1924, an attempt was made to acquire stock of the St. Louis-San Francisco Railway Company in the open market, but after acquiring 1,400 shares the price advanced so rapidly that the idea was abandoned and the stock so acquired was sold during the latter part of the same month at a profit of \$11,786.50. Also in October, 1924, Otto Kahn, of Kuhn, Loeb & Company advised Loree that that firm and some of his associates were buying Missouri-Kansas-Texas stock and asked him if he desired to take an interest with them. Loree acquiesced, and on November 6, 1924, there were purchased for him 11,950 shares of common stock at \$19.68 per share, costing \$235,176.

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On November 7, 1924, there were purchased for him 2,050 shares of common stock at \$21.25 per share, costing \$43,562.50, making the total cost, including brokerage commissions and interest, \$285,872.14.

About November 10, 1924, Kahn informed Loree that he had been approached by Swartwout & Appenzellar, a brokerage firm in New York, with an offer of sale of that firm's holdings of Missouri-Kansas-Texas stock, and asked Loree whether the Kansas City Southern desired to buy it. Loree presented the matter to the special committee, which decided to acquire the stock. On November 11 it purchased 25,000 shares and took options on 17,600 shares for delivery on November 25 and 50,000 shares for delivery on December 5. Kuhn, Loeb & Company received a commission of 50 cents per share on this stock. Following this action by the special committee, Loree notified Kahn that he did not want any more Missouri-Kansas-Texas stock purchased for him, and requested that the stock theretofore purchased for him be sold as soon as these Kansas City Southern purchases were completed.

The record shows that the 17,600 shares under option from Swartwout & Appenzellar were delivered on November 26, 1924. On November 25, 1924, Kuhn, Loeb & Company also sold to Kansas City Southern 50,000 shares, which stock was apparently owned by themselves and not included in the Swartwout & Appenzellar options. On December 5 the Kansas City Southern took delivery of the remaining 50,000 shares of the Swartwout & Appenzellar stock. Meanwhile there had been purchased in the market through two stock exchange firms a total of 19,600 shares, all of which were delivered to Kansas City Southern on November 20, 1924. Consequently on December 5, 1924, the Kansas City Southern held 162,200 shares of Missouri, Kansas & Texas common stock. Of this amount there had been purchased at private sale and by options all but 19,600 shares. The purchases of stock made in the open market, delivery of which was taken on November 20, 1924, showed prices ranging from \$23.50 per share to \$25 per share.

In accord with Loree's instructions to Kuhn, Loeb & Company to sell his stock when these purchases were completed, on December 3, 1924, 4,000 shares of Loree's stock were disposed of at \$28.06 per share, and the remainder was sold as follows for January delivery at seller's option: December 5, 1924, 2,000 shares at \$32.375 per share; December 6, 1924, 6,000 shares at \$32.25 per share, and December 8, 1924, 2,000 shares at \$31.375 per share. The net profit to Loree on this transaction was \$144,708.

Following exercise of the options to purchase Swartwout & Appenzellar stock, and the purchase of the 50,000 shares from Kuhn, Loeb & Company, together with the 19,600 shares purchased in the open market no further purchases were made by Kansas City Southern of Missouri-Kansas-Texas stock between December 5, 1924, and January 26, 1925. Between January 26, 1925, and February 17, 1925, the Kansas City Southern acquired 87,800 shares of Missouri-Kansas-Texas stock in the market, so that as of the latter date it held 250,000 shares which had been acquired at prices ranging from \$23.50 to \$38.50 per share. This stock was purchased through Kuhn, Loeb & Company, Boissevain & Company, Post & Flag, and Ladenburg, Thalmann & Company. The record shows that no more stock was purchased until August 19, 1925, but meanwhile, on April 10, 1925, Loree had been elected to the board of directors of the Missouri-Kansas-Texas and was authorized to hold that position by our order of April 11, 1925, referred to above. Following his election as a director, Loree was elected chairman of the board. Between August 19, 1925, and October 15, 1925, the Kansas City Southern purchased 100,000 shares additional of Missouri-Kansas-Texas stock at prices ranging from \$40 to \$43 per share making its total holdings 350,000 shares. The purchase price of this stock was \$11,381,550 and brokerage commissions amounted to \$84,467.50, making the total cost of \$11,466,017.50. The average price per share was approximately \$32.76.

On October 14, 1925, the Kansas City Southern purchased from the Chicago, Rock Island & Pacific Railway Company 134,880 shares of preferred and 19,288 shares of common stock of the St. Louis Southwestern Railway Company, paying 92 per share for the former and \$60 per share for the latter. On November 10, 1925, the Kansas City Southern purchased

in the open market through Ladenburg, Thalmann & Company 100 shares of preferred at \$73.50 per share, 20 shares of preferred at \$73.625 per share, 700 shares of common at \$53.50 per share, and 12 shares of common at \$53.625 per share. Upon completion of these latter purchases, the Kansas City Southern held 135,000 shares of preferred and 20,000 shares of common stock of the St. Louis Southwestern, the total cost including commissions on the stock bought in the market, being \$13,613,301.60. Subsequently all of this stock was sold at cost to the Missouri-Kansas-Texas, subject to our approval, that company paying \$7,000,000 in cash and giving notes for the balance. The stock is now held in escrow by the Central Union Trust Company of New York under an escrow agreement dated July 23, 1926, and a supplemental escrow agreement dated November 18, 1927. The record shows that the agreement between the Kansas City Southern and the Missouri-Kansas-Texas provides that in the event the latter company fails to pay the balance of the purchase price within 90 days after our approval of the transaction, the \$7,000,000 which is paid shall be forfeited to the Kansas City Southern and all of the stock shall revert to the latter company. It appears extremely doubtful that such a penalty clause would have been approved by any board of directors of the Missouri-Kansas-Texas uninfluenced by the Kansas City Southern.

After the purchase of the St. Louis Southwestern stock by the Kansas City Southern, consideration was given to various plans for financing the purchase, one of which contemplated the distribution of the burden among the three companies involved, and was designated the triangular plan. At the hearing in *Proposed Unification of Southwestern Lines* (124 I. C. C. 401) Loree testified that the president of the St. Louis Southwestern, Daniel Upthegrove, had advised that he thought his company would be willing to purchase 100,000 shares of Missouri-Kansas-Texas stock, and arrangements to do so were made. At the hearing in the present case Loree testified that Upthegrove came to him one day and said that his company had about \$4,000,000 in cash in its treasury for which it had no immediate use, and suggested that the money be used to purchase 100,000 shares of Missouri-Kansas-Texas stock. Following the purchase of this stock by the St. Louis Southwestern, counsel reached the conclusion that the law did not permit several companies to control a company, and that the triangular plan was not tenable, whereupon Upthegrove asked the Kansas City Southern whether it would take over the 100,000 shares of Missouri-Kansas-Texas stock which his company had bought. Following negotiations arrangements were made to take over the stock as of a date six months after our findings in the Southwestern case. The average price paid for this stock by the St. Louis Southwestern was \$44.80 per share.

Under date of October 30, 1925, Loree filed with us an application for authority to hold the position of director of the St. Louis Southwestern. On June 9, 1927, following our decision in the Southwestern case, Loree requested that this application be withdrawn.

On July 24, 1926, the Kansas City Southern filed an application under paragraph (2) of section 5 of the interstate commerce act for authority to acquire control of the Missouri-Kansas-Texas by purchase of capital stock, and on the same date the latter carrier filed a similar application for authority to acquire control of the St. Louis Southwestern in the same manner. By our report and order in *Proposed Unification of Southwestern Lines*, *supra*, dated May 3, 1927, we found that the proposed acquisitions of control would not be in the public interest and the applications were denied. Following that action, Upthegrove asked the Kansas City Southern whether it would take over the 100,000 shares of Missouri-Kansas-Texas stock which were held by the St. Louis Southwestern. Loree testified that while the Kansas City Southern felt that it was not legally or morally obligated to take over this stock, business considerations appeared to make such action advisable. Anticipating the tender of the stock, the Kansas City Southern commenced selling it in the market through Ladenburg, Thalmann & Company and before November 1, 1927, when the stock was delivered, it had sold 61,400 shares. The remaining 38,600 shares subsequently were transferred, together with 19,100 shares of the stock held by the Kansas City Southern, to the Cuthbert Corporation, which had assumed the obligation of the Kansas City Southern to take over the stock held by the St. Louis Southwestern. The St. Louis Southwestern received for its stock the amount which it had paid for it, plus interest at the rate of 4½ per cent per annum.

In view of the fact that on June 20, 1927, when the Kansas City Southern commenced selling the 61,400 shares mentioned above the highest price was \$56.375 per share, and the lowest price received for any of that block up to October 20, 1927 was \$45.50 per share, it is not apparent why Upthegrove should have sought the aid of the Kansas City Southern; neither does the record show just what "business considerations" prompted the Kansas City Southern to take the action described by Loree. In any event, Loree testified in the Southwestern case that the

Kansas City Southern was obligated to acquire this stock from the St. Louis Southwestern within six months after our decision in that case. The sale of the 57,700 shares to the Cuthbert Corporation through Ladenburg, Thalmann & Company commenced on December 5, 1927, and ended on January 27, 1928, the highest price per share received being \$44.50 and the lowest price \$38.375. The identity of the Cuthbert Corporation is not shown of record.

On February 14, 1928, in Docket No. 20672, we issued a complaint against the Kansas City Southern alleging that the ownership by that company of large portions of the stock of the Missouri-Kansas-Texas and the St. Louis Southwestern constituted a violation of section 7 of the Clayton act. In its answer dated March 28, 1928, the respondent stated that it had disposed of 119,600 shares of Missouri-Kansas-Texas stock, including the 100,000 shares acquired from the St. Louis Southwestern; that a greater amount could not have been sold in the market without seriously disturbing market conditions and causing unnecessary loss; that respondent then held 330,400 shares of Missouri-Kansas-Texas stock, or 25.16 per cent of the total amount outstanding, and that on March 21, 1928, the board of directors of the respondent adopted a resolution stating that the respondent should proceed to liquidate the remainder of the stock held by it as soon as permitted by market conditions through the sale of such stock, or by granting subscription rights to all or any part of such stock, or by trustee for sale all or any part of such stock, or by any combination of such methods. By a supplemental answer dated May 24, 1928, the respondent stated that between March 29, 1928, and May 22, 1928, it had sold in the market 42,784 shares of Missouri-Kansas-Texas stock, and that on May 23, 1928, it sold the remaining 287,616 shares to Ladenburg, Thalmann & Company and the National City Company, of New York City, and received payment therefor in full. The record shows, however, that on May 22, 1928, Loree, as chairman of the board of directors of the Kansas City Southern, advised the holders of the common stock of that company that in connection with the sale of the 287,616 shares of the Missouri-Kansas-Texas stock, arrangements had been made under which each holder of common stock of the Kansas City Southern of record at the close of business June 4, 1928, should have the right to purchase from the bankers, on or before June 25, 1928, 96/100 share of Missouri-Kansas-Texas common stock for each share of Kansas City Southern common stock held, at the price of \$33 per share, payable in full at the time of making the purchase. Purchase warrants and fractional warrants were sent to the stockholders on June 4, 1928. Meanwhile, on March 27, 1928, the Missouri-Kansas-Texas filed an application under paragraph (2) of section 5 of the act for authority to acquire control of the Kansas City Southern and/or the St. Louis Southwestern by purchase of capital stock, Finance Docket No. 6817, which is now pending before us. The intervenor Duff, who is president and principal owner of the Waco, Beaumont, Trinity & Sabine Railway Company, alleges that his private interests are affected by the retention by Loree of his membership on the board of directors of the Missouri-Kansas-Texas. The lines of Waco, Beaumont, Trinity & Sabine extend from Weldon to Livingston, Texas, and from Trinity to Colmesneil, Texas. These lines formerly were part of the Missouri, Kansas & Texas Railroad, but were not included within the present system at the time of reorganization. The record shows that the Missouri-Kansas-Texas had been very friendly to Duff and had given him assistance in connection with the operation of his properties and also in connection with proposed extensions of his line from Weldon to Waco, Texas, and from Livingston to Beaumont and Port Arthur, Texas, both of which have been authorized by us. The Missouri-Kansas-Texas had favored the proposed extensions because of the fact that they would enable it to gain access to Beaumont and Port Arthur from Waco. The extension of Duff's line to Port Arthur had been strongly opposed by the Kansas City Southern. Following the adoption of the plan for unification of the southwestern lines, and the election of Loree as chairman of the board of directors of the Missouri-Kansas-Texas, the attitude of that carrier toward Duff changed and the support formerly given him was withdrawn.

The record shows that at the time of issuance by Division 4 of its order of April 11, 1925, the Kansas City Southern held 250,000 shares of the stock of the Missouri-Kansas-Texas and that Loree was chairman of the board of directors of the former company. It also shows that the Kansas City Southern has divested itself of its holdings of Missouri-Kansas-Texas stock.

In the light of the above facts, we are unable to find that the holding by Loree of the position of director of the Missouri-Kansas-Texas while continuing to act as director of the Kansas City Southern would not adversely affect public or private interests. That portion of our order of April 11, 1925, authorizing Loree to hold the positions of director of the Missouri-Kansas-Texas will be vacated and set aside.

T. & T. Section of A. R. A. Meets in San Francisco

Progress in railway communication field outlined—Economic aspects of message traffic studied

THE technical developments and operating problems of railway communication service formed the subject matter of the reports and discussions at the twelfth annual meeting of the Telegraph and Telephone Section, A.R.A., held at the St. Francis hotel, San Francisco, Cal., on September 18, 19, and 20. Worth Rogers, superintendent of telegraph of the Missouri Pacific, and chairman of the section, called the meeting to order at 9:30 a.m., Tuesday morning.

At the Wednesday afternoon session three papers were read, all dealing with the problem of inductive co-ordination of communication and power lines, although each paper aimed to treat the subject from the particular viewpoint of the author. L. O. Whitsell, president of the California Railroad Commission; Paul M. Downing, vice-president in charge of electrical construction and operation of the Pacific Gas & Electric Company, and C. E. Fleager, chief engineer of the Pacific Telephone & Telegraph Company, pointed out the need for intelligent co-operation in dealing with this important problem. The railway viewpoint on this subject was voiced by G. T. Stanton (N. Y. C.), who emphasized the points raised in each of the preceding papers, which had particular bearing on the railway communication service.

At the Wednesday afternoon session William Sproule, president of the Southern Pacific Company, spoke briefly on a number of subjects closely related to railway communication. Sketching hurriedly the development of the telegraph to the present state of efficiency and the later evolution of the telephone, both of which today are indispensable in railway operation, Mr. Sproule continued his abstract of activities of the Telegraph and Telephone Section by emphasizing the importance of attending the meetings of the respective sections of the A.R.A. A "stay-at-home" policy in this respect begets a narrow and distorted viewpoint regarding one's sphere of activity, as is sometimes indicated by the "cock-sureness" exhibited by men who do not attend A.R.A., or other technical society meetings. Mr. Sproule closed his remarks with a plea that the section should strive to increase its usefulness to the steam railroad industry.

A total of 240 members and guests, not including ladies, registered at the three-day meeting. Election of officers for the ensuing year resulted in the choice of J. McMillan (C. P.) for chairman; J. C. Johnson (Penna.) first vice-chairman; and P. F. Frenzer (U. P.) second vice-chairman. The following members were elected to the Committee of Direction: H. A. Shepard (N. Y., N. H. & H.), J. F. Caskey (L. V.), R. H. Corson (Erie), R. F. Finley (N. Y. C.), H. C. Chace (A., T. & S. F.) and A. W. Flanagan (S. P.). Following a meeting of the Committee of Direction, it was decided to hold the next annual convention at St. Paul, Minn., on September 10, 11 and 12, 1929.

The report of the Committee on Message Traffic, of which G. D. Hood, superintendent of telegraph, Chicago, Rock Island & Pacific, was chairman, reviewed a number of new developments in operating practices, particularly with respect to the printing telegraph art. The

committee also outlined a method of making a study leading to greater accuracy, by classifying errors found in railroad message traffic. In a separate exhibit, the committee described briefly two noteworthy applications of the telegraph printer in main-line operation, namely, on the Southern Pacific and the Pennsylvania. The first-named installation comprises a circuit between San Francisco, Cal., El Paso, Tex., and Houston, and another between Houston, Chicago and New York, each approximately 2,200 miles in length. These circuits operate at a speed of approximately 55 words per minute per channel. Repeater stations are located approximately 300 miles apart. The printer installations have saved one telegraph circuit between San Francisco and New York, and have improved the telegraph service between all points, as well as effecting a substantial operating economy, since each printer channel has practically twice the capacity of a Morse circuit.

The Pennsylvania has recently installed, at its Chicago terminal, a printer concentrator to handle the telegraph file of a number of lightly loaded printer circuits. With this new facility the attending operator can handle business on several printer circuits without moving from his position, by inserting a plug in the proper jack. Aside from the operating advantages of this scheme, economies in apparatus and saving of floor space are effected.

To keep the Pennsylvania's car tracing bureau at Pittsburgh, Pa., informed of the movement of all loaded cars through the four adjacent yards, a tape printer circuit has been installed between the tracing bureau and each yard. This job is accomplished by making out at each yard, a form known as a yard sheet for each train departing from that yard. Space is provided on this sheet for engine and train numbers, departure time, conductor's name and destination. The significant feature of the report is the manner of listing the loaded cars in 10 groups. The first group includes all car numbers ending with the numeral "1," the second group contains those ending with "2," etc. As soon as this sheet is compiled at the yard office, the information entered on it is transmitted by the tape printer to the car tracing bureau. In doing so, the train description is first transmitted, followed by the 10 groups of car numbers.

At the tracing bureau, the information on the tape is copied on a passing report form, the car numbers being further divided into 100 groups. As each train list is transmitted to the tracing bureau, it is filled in on the passing report sheet for that particular yard, so that at any time during the day, the car tracing bureau has a complete record of the movement of cars out of each yard. At the end of the day this sheet is closed, and 85 copies are manifolded on a Ditto machine, these copies being mailed to various offices and freight agents for use the following morning. This arrangement has resulted in a decided saving in telephone facilities that were formerly tied up by shippers in tracing their cars, and has greatly improved the service to shippers, since the tracing bureau has all necessary information available to answer inquiries without the necessity of calling the yard.

A four-station page-printer circuit on the Southern

Pacific at Los Angeles, Cal., handles about 350 messages per day, consisting of diversion telegrams and manifest and passing reports. Twenty-four hour printer service is provided, replacing eight-hour messenger service with a saving in time and messengers' salaries that will pay for the installation in about three years. This circuit is operated over a single wire equipped with selector apparatus. When any station desires to communicate with another, the number is dialed on a modified type of automatic telephone dial. This operates the desired selector and automatically energizes the printer set at the selected station. Upon completion of the message, another number is dialed to shut down the printer set at the receiving station. If desired, all stations may be selected simultaneously. The Union Pacific has a similar three-station circuit in operation in Los Angeles.

Recently the New York, New Haven & Hartford has installed tape printer circuits at its passenger terminals in Providence, R. I., New Haven, Conn., and Hartford for transmitting information regarding the time of arrival and departure of trains and other related information to various locations in the station. Satisfactory results are reported.

In another exhibit, this committee outlined a method of handling report forms on page printers. For this purpose a number of railroads have substituted plain paper for printed blanks. The sending operators, in transmitting these forms, block them out so that the received printed copy follows closely the makeup of the printed form. Rubber stamps indicating the form number are used on these received copies for ready identification. Experience has disclosed that the railway departments using these forms soon become accustomed to receiving them in this manner and are not inconvenienced by the printer method of handling.

Use of Tape Printers

Tape printers may also be used advantageously where form work is involved, since the message form at the receiving end is entirely under the control of the receiving operator. Another advantage of tape printers is that they do not consume the time of the sending operator for tabulation of form work. Additional copies are readily made at the receiving office by the use of a copying ribbon and a gelatin bed duplicator. Fifty legible copies can be made in this manner. If a larger number of copies is required, a hectograph ribbon may be used on the tape printer.

Discussion

During the discussion of this report, G. T. Stanton (N. Y. C.) mentioned that the New York Central had effected an approximate annual saving of \$110,000 through its telegraph printer installation in New York harbor, by expediting the marine freight traffic. The annual investment charges on the installation have been earned many times because of the accelerated freight movement. Freight arrival notices are transmitted by teletype machines, six copies of each notice being received at the Beaver street office in Manhattan. Special telegraph forms expedite the manifolded of the required six copies of each arrival notice. It was suggested by two telegraph superintendents that much of the reconsignment work now being handled by telephone could better be handled by printers. Coal traffic headed for large industrial centers was cited as one example, because errors are frequently introduced when the tariff revision bureau of the railroad computes the freight charges on this traffic by relying solely upon telephone description of the cars, consignees, etc. G. R. Stewart (I. C.) called attention to the method of handling coal car diversions in the Chicago terminal of the Illinois

Central with the aid of teletype equipment. During the busy season, from 700 to 1,000 diversions daily are handled satisfactorily.

It was indicated that it has been the experience of the Western Union Telegraph Company that the maintenance expense on tape printers is much less than on the page type. Of 2,000 page printers and 4,000 tape printers, cost studies have shown that the latter type of printer can be maintained satisfactorily in commercial telegraph service at a cost ranging from 50 to 70 per cent of that of the page-type machine. Performance records indicate that the tape printers will transmit over 17,000 messages per trouble call. On the other hand, it was indicated that on two roads, the page-type printers are being maintained economically. In one instance, a lineman keeps the machines in order at an average cost of \$15 per machine, while on another road one man maintains 16 teletype page printers without any difficulty.

The Committee on Communication Development, of which J. A. Jones, general superintendent of telegraph, Southern, was chairman, reported on 18 new developments in communication apparatus and practices. Some of the equipment described in the committee's exhibit was of a highly technical nature and is not further referred to here. Two cable appliances, a cable ring and a cable clamp, were described, both of which are claimed to reduce abrasion of the cable sheath. The cable ring is "V" shaped at the bottom, instead of the conventional circular shape. The cable clamp is designed to slip over the cable ring and is claimed to prevent the cable from twisting.

A high-efficiency type of portable telephone, housed in a substantially built waterproof case, has been developed. Because this set will disconnect itself from the circuit automatically when not in use, the telephone circuit on which it is used will not be adversely affected by the set. This feature makes the telephone particularly suitable for the use of construction gangs.

The American Telephone & Telegraph Company has developed a single-channel carrier system, which is said to be sufficiently inexpensive to "prove in," under some conditions, on circuits as short as 75 miles in length.

A cable joint wiping machine was described which utilizes electric heating units to raise the temperature of the solder to about 875 deg. F. After the apparatus has been mounted over the cable and the temperature of the solder properly adjusted, it is said that less than one minute is required to apply and form the solder properly.

A new wood preservative, using a granulated dust (a by-product of copper smelting) is now available for treating both old and new poles.

The committee studying radio and wire carrier systems has kept in touch with manufacturers of radio equipment. Some of the applications which have been considered, include communication between shore stations and tug boats or other harbor craft used in railroad service; the application of wire carrier systems to the electric light or power lines of steam and electrified railroads; front to rear-end communication on long freight trains; protection of radio systems installed on cars where possible contact may occur between antenna wires and high-tension overhead systems; and the feasibility of establishing radio communication in emergencies when all other means of communication fail.

Communication between shore stations and tug boats is physically possible, but a complete survey must be made to determine the economic feasibility of this method of communication. Manufacturers are actively engaged in the design of experimental sets for front to rear-end radio communication on freight trains. Additional modifications have been made in the radio equip-

ment installed on the New York Central, and continuous service tests have demonstrated its reliability. Service records of this radio equipment are being maintained and it is expected that these will show the economic value of radio communication facilities for this purpose. The committee called attention to the saving made in the avoidance of train stops, and in the elimination of the necessity of train crews walking the length of the train. At the present time, a permanent installation of radio communication equipment is being made on the Chesapeake & Ohio as a result of the successful experience of the trial installation. The New York Central has found it possible to maintain radio communication from a signal tower to a radio-equipped train for a distance of approximately five miles on each side of the tower.

This committee, through G. T. Stanton, telegraph and telephone engineer, New York Central Lines, chairman, has made formal request of the Federal Radio Commission for one or more communication bands having a total minimum width of approximately 144 kilocycles, which is estimated to provide 12 channels for radio telephone train communication equipment.

Some doubt was expressed as to the reliability of head-to-rear-end radio communication equipment in highly congested areas. It was pointed out that serious interference problems existed, both as between trains of the same railroad and of neighboring roads; but admitting the existence of this possibility, and the value of conservative analysis of the weak points as well as the advantages, Chairman Stanton expressed the view of the committee to the effect that the railroads should lend their efforts toward developing this new communication agency, because the obstacles which may now seem insurmountable will likely be solved satisfactorily.

In the report of the Committee on Economics, of which I. C. Forshee, telegraph and telephone engineer, Pennsylvania, was chairman, the results of a questionnaire were presented, indicating the economies resulting from the consolidation of telegraph offices and telephone exchanges; the operation of motor cars; the maintenance of camp car outfits for construction gangs; and the installation of telegraph printers in yards and terminals. The report was based upon replies received from 37 Class I railroads with about 150,000 miles of line.

Six railroads with about 40,000 miles of lines reported that since 1920 telegraph offices have been consolidated at 26 points. Before these consolidations, 61 offices were maintained, whereas the business is now handled in 31 offices. The operating forces have been reduced from 194 to 142, and the total annual savings effected, including the cost of offices and employees, amounted to \$122,500. There have been improvements in the service also through these consolidations.

Twelve railroads, with a mileage of about 68,000, reported the consolidation of the telephone exchanges at 22 locations in which 51 switchboards were replaced with 23 of improved type, and the number of employees reduced from 208 to 172 with an annual saving in labor and rentals of \$42,500. In general, valuable floor space was released which could be used for other purposes. In most instances, 24-hour service is provided in a consolidated exchange with fewer operators than were formerly required to give part-time service through the scattered private branch exchanges.

Twenty-seven railroads, with a mileage of about 90,000, reported using track motor cars in construction and maintenance work in the telegraph department. In a few cases these were furnished by the commercial telegraph company for use by the construction gangs under the terms of the company's contracts, but exclusive of these 120 were furnished by the 27 railroads for use by

the gangs and 592 for use in maintenance work. The time saved by the use of motor cars as compared with other methods of travel to and from the work varied, with an average of about 15 man-hours per day per gang, or a total of over 1,625 man-hours per day. This saving in time amounted to \$136,000 per annum, based on the regular rates of pay, or \$1,133 per gang. In maintenance work, the use of motor cars accounted for a daily saving of about 2.7 man-hours per car, per day, or a total of 1,600 man-hours, which amounted to an annual saving, based on the normal rates of pay, of \$140,000.

A higher grade of communication service is one of the direct results from the use of motor cars, based on the reported time required to clear trouble when using the hand car or train as compared with the motor car. With the hand car or train service, this time varied from 3 to 7.5 hours, with an average of 4.8 hours; whereas, with the motor car, the time varied from 1 to 5 hours, with an average of 2.5. In other words, the communication system is out of service only about half as long where motor cars are used for maintenance, as when the maintainers are dependent upon hand cars or train service. This condition varies on sections of railroad where there is frequent train service.

The monetary savings as reported by these 27 railroads, based on the increase in the amount of work done by the gangs and maintainers, the increase in the maintainer's territory, and the shorter time required to clear trouble, where motor cars are used instead of hand cars or regular train service, amounted to about \$375,000 per annum.

Camp cars are used quite generally in the construction and reconstruction of pole lines on railroads. Sixteen railroads, having a mileage of about 60,000 reported using the camp car outfits, including 143 material cars, 116 sleeping cars, 79 dining cars, 51 tank cars, and 11 kitchen cars. Some also included in the outfits, an office car, a lounging car, tool and fuel cars, pole cars, flat cars, etc. These outfits accommodated a total of 1,112 men or an average of about 16 men per outfit. They effected a saving of about \$360,000 a year for board and lodging, as compared with the cost if boarding houses and hotels had been used. In many places these latter accommodations were not available, unless unreasonably long passenger train hauls had been resorted to, which would have been impracticable. The savings through this means, on account of the reduction in lost time in traveling to and from work, amounted to over \$181,000 per year, making a total annual savings of about \$541,000. In computing the above savings, consideration was given to the annual charges against the camp car investment, cost of maintenance, transportation and switching of outfits, as against other costs of board and lodging and transportation of men, tools and materials.

Nine railroads, having a mileage of about 42,000, reported the installation of printers in yards and terminals at 28 locations, including a total of 91 printers. An annual saving of about \$15,000 has been effected.

Six subcommittees handled the work assigned to the Committee on Construction and Maintenance of Outside Plant, of which H. A. Shepard, general superintendent of electric transmission and communication, New York, New Haven & Hartford, was chairman. These six subcommittees reported on (1) the construction of pole lines, wires and cables; (2) wire crossings; (3) underground construction; (4) transpositions; (5) outside plant maintenance; and (6) outside plant construction methods. J. C. Johnson, general superintendent of telegraph, Pennsylvania, as chairman of subcommittee A, presented the report on the construction of pole lines, wires and cables, which reviewed the use of treated poles

and timber in telegraph and telephone construction, with the view of obtaining data respecting actual economies that have been derived through the use of treated timber. This subcommittee also submitted a report of a test of an earth-boring machine for pole-hole boring and setting operations.

In a separate exhibit, the subcommittee submitted figures prepared by the United States Department of Agriculture, tabulating the number of treated poles employed in the United States for all purposes. According to these statistics, 3,637,989 treated poles of various kinds of wood were used during 1927. In the same year the American Telephone & Telegraph Company used 841,470 treated poles as compared to 39,990 untreated. The Western Union Telegraph Company used 255,547 treated poles in the same year, compared with 7,435 untreated. The methods of treatment described in the A.R.A. specifications covering the open tank and pressure treatments of timber still represent the most modern practice, insofar as the use of creosote as a preservative is concerned. A commercial telegraph company is continuing its investigation of preservative treatments employing recently developed insoluble salts such as zinc meta-arsenite. This telegraph company is at present placing about 10,000 yellow pine poles treated with zinc meta-arsenite and it is expected that next year will witness a much more extensive use of poles treated in this manner.

In another exhibit the subcommittee described the test of an earth-boring machine and pole setter as conducted by a commercial telegraph company. The machine tested was of the type mounted on a caterpillar tractor and, with two exceptions, was able to reach every one of 451 pole locations along the railroad right-of-way. A time study showed that the average time for digging a hole was 2 min. and 25 sec. An average time of 9 min. and 56 sec. was required per location for all of the operations involved in digging, setting poles and moving the machine and men.

On the basis of a labor and fuel cost of \$2.66 per hour, the cost per hole dug and pole set, including moving and setting-up machine, amounted to 44 cents. This figure did not, however, include any overhead expense, which will vary according to the use made of the machine. It is stated that by careful planning the machine can set 40 poles per day for 100 days per year. In this case, the total cost per hole dug and pole set would amount to \$1.25, including back filling and tamping. It was pointed out that even a limited use of the machine, under conditions encountered in the field, would be much more economical than setting by hand, as the estimated cost of which under similar conditions is about \$6 per hole dug and pole set.

A sub-committee presented a revised specification covering wire crossings of telegraph, telephone and other communication wires and cables either over or under the tracks of steam and electrified railroads. One section of the specification dealt with overhead crossings; a second part with what are called "underbridge" crossings, and a third with underground crossings. The engineering requirements of the construction and maintenance of communication lines which cross the tracks of steam and electrified railroads were fully outlined in this specification. The committee's work was directed toward co-ordination of its own specification with the recent provisions of the National Electrical Safety Code. Proper clearances and relative levels of supply and communication lines were specified for supply circuits not exceeding 750 volts above ground potential.

During the discussion of the committee's report, Chairman Rogers called upon P. J. Howe, construction engi-

neer of the Western Union Telegraph Company, to describe the nature of the zinc-meta-arsenite preservative treatment for wood poles. Once deposited in the cells of the timber, this agent is insoluble in water and is not likely to leach out. Accelerated "weathering" tests have been conducted to determine, in a short space of time, the relative merits of this method of treatment. For these purposes, small wood chips have been employed because they present a relatively larger surface per unit of volume than is actually encountered in practice. Ten months' test experience has indicated, according to Mr. Howe, that none of the zinc-meta-arsenite is lost. Other preservatives, he said, did not show up as favorably under the particular conditions of this test. There is a tendency with some preservatives to lose their more volatile constituents as time progresses and these, it was pointed out, are the most toxic to destroying organisms. No change in mechanical strength of wood has been noted after treatment with zinc-meta-arsenite. Electrical resistance of timber so treated, increases about 50 per cent as compared to the untreated wood of the same species.

Other Reports

The work of the Committee on Construction and Maintenance of Inside Plant was divided among four subcommittees dealing respectively with (1) apparatus, material and tools, (2) locations and layouts, (3) telephone and miscellaneous equipment, and (4) telegraph equipment. G. R. Stewart, telegraph and telephone engineer of the Illinois Central, was chairman of the committee. The report of the Subcommittee on Apparatus, Material and Tools, of which J. G. Gilgrist (N. P.) was chairman, consisted of seven technical specifications embracing 105 printed pages. A specification for standardizing the method of connecting observation and business cars with telephone lines leading to city exchanges, while such cars are standing in railway terminals, was presented as part of the report of the Subcommittee on Telephone Equipment. Consideration of measures to minimize inductive interference between telegraph and telephone circuits and adjacent power lines formed the subject of the report of the Committee on Inductive Interference.

The Committee on Communication Transmission presented a report recommending practices considered to be beneficial to railroad telegraph transmission. This study related to the electrical transmission characteristics of telegraph circuits and apparatus such as now commonly used by the railroads.

A number of cases of electrolysis were reported by the Committee on Electrolysis Protection, which has studied the subject of protecting communication circuits against the destructive action of electrolysis. The Committee on Electrical Protection reviewed the work of the National Electrical Safety Code to insure co-ordination with its own specifications and recommendations covering electrical protection and found no essential differences.

Accident prevention and first-aid for communication employees formed the subject matter of the report of the Committee on Accident Prevention and First Aid. It submitted a code of instructions to assist employees of the telegraph and telephone departments in avoiding accidents and personal injuries. It was pointed out that an important factor in preventing accidents is the proper planning and co-ordination of the work well in advance of its execution. Rush work leads to accidents and frequently can be avoided through proper supervision, planning and co-ordination. Those in direct charge of the work must interest themselves in accident prevention; be thoroughly familiar with the code of instructions and efficiently carry out the work as planned.

A. E. R. A. Receives Heavy Electric Traction Report

Bonding, self-propelled cars, articulated trains and data covering electrified mileage and locomotive tonnage are considered

A MAJOR portion of the report on heavy electric traction presented this week at the annual convention of the American Electric Railway Association consists of a collection of data covering the use of supplementary negatives and reclamation of rail bonds. Questionnaires were sent to the various railroads and replies were received from all but the Pennsylvania, which was not in a position to collect the information. A summary of the replies received is included in the two tables. The committee states that the subjects are completed and recommends they be discontinued.

these three manufacturers as to the compositions and specific resistances of steel and copper alloy welding metals for the application of bonds.

Co-operation of A. R. A. Sought

The committee states this information can now be assembled and a study made in an endeavor to agree upon some standard dimensions for welded bond terminals. It recommends that the subject be continued and that the committee endeavor to secure the cooperation of the Electrical section of Engineering division of the Ameri-

Tabulation of Replies Received To Questionnaire on Reclaiming Rail Bonds

Group A—Electrified Steam Railroads—Alternating Current System

Name of Railroad	Rail bonds removed and reused	Reason not done	Done in past	How reconditioned and reapplied	Reduction in life due to reuse
Boston & Maine.....	No	Stud terminal too small for satisfactory reapplication. No attempt with welded bonds.	No .....	.....	.....
Canadian National Sarnia Tunnel..	Yes .....	.....	.....	Studs of concealed bonds cleaned. Welded bonds re-welded.	None
Detroit, Toledo & Ironton.....	No	Not considered practical with welded bonds.	No .....	.....	.....
Great Northern	Yes .....	.....	.....	Used only if in good condition....	None
Norfolk & Western.....	Yes .....	.....	.....	Old terminals trued-up and oversized pins used. Old strand soldered to new socket terminals.	None
Virginian	Yes .....	.....	.....	Old terminals machined and oversized pins used. Old strand soldered to new socket terminals.	None
New York, New Haven & Hartford	No	Not considered economic.....	.....	.....	.....

Group B—Electrified Steam Railroads—Direct Current System

Baltimore & Ohio.....	No	For economic reasons.....	.....	.....	.....
Butte, Anaconda & Pacific.....	No	For economic reasons.....	.....	.....	.....
Canadian National (Montreal Electric).	No	Removed bond not fit for reapplication.	.....	.....	.....
Chicago, Milwaukee, St. Paul & Pacific.	No	Not practical with welded bonds.	Yes	Used to reapply pin-expanded bonds.	.....
Illinois Central	Yes .....	.....	.....	Only if strand and terminals are in good condition.	.....
Long Island	No	Brazed bonds not adapted for reapplication.	No .....	.....	.....
Michigan Central	No	Due to cost of reconditioning and high scrap value.	Yes	Expanded terminal bonds were originally used and they were reapplied.	.....
New York Central.....	No, except for temporary work.	Unsatisfactory result.	Yes	In past manufacturer reformed terminals. Discontinued because of expense and unsatisfactory results.	.....
Southern Pacific	No	New welded bonding. Necessity has not arisen.	Yes, with pin bonds.	.....	.....
Staten Island Rapid Transit.....	No	Bonding recently done. No practice established.	.....	.....	.....

Group D—Heavy Traction Lines—Direct Current System

Boston Elevated Railway.....	No	Not of sufficient economic value.	.....	.....	.....
Chicago Rapid Transit Company...	No	Cost of reclaiming and use exceeds cost of new bond.	No .....	.....	.....
Interborough Rapid Transit (Manhattan Elevated).	No	Bonds practically destroyed in removal from rail.	.....	.....	.....
Interborough Rapid Transit (Subway).	No .....	.....	.....	.....	.....
Brooklyn Manhattan Transit Corporation.	Not on main lines	Terminals too much deformed...	.....	Milled to size and drilled. Compressed bonds reinstalled as pin driven bonds.	.....
Philadelphia Rapid Transit Company.	Yes, when possible.	When bonds practically destroyed in removal.	.....	No method of reconditioning.....	None

With regard to recommended practice as to contact areas and resistances of rail contacts, the committee states that considerable data have been collected. The standard dimensions of various kinds of rail bond terminals have been submitted to the committee by the American Steel and Wire Company, the Electric Railway and Improvement Company, and the Ohio Brass Company. Additional information has been furnished by

can Railway Association on the work now being done in connection with rail bond standardization. Without this cooperation, the committee feels that any studies it makes are likely to conflict with conclusions reached by that body.

Substitutes for Bonding

Further information on the use, abroad, of compositions used on rail joints in place of bonds, supplementary

to that given by Henry W. Blake and which appeared in the 1927 report, has been obtained from the manufacturers selling the apparatus for spraying rail ends with molten metal, tending to show an increase in the application of this method. The committee has initiated several independent investigations abroad, and expects to have

can Railway Association, the Mechanical division of the A. R. A. and the National Electric Light Association.

The report is signed by A. H. Armstrong, L. W. Birch, S. B. Cooper, A. H. Daus, J. C. Davidson, J. H. Davis, J. V. B. Duer, H. H. Febrey, J. T. Hamilton, W. E. Huber, E. C. Johnson, J. S. Thorp, L. S. Wells,

Tabulation of Replies Received To Questionnaire on Supplementary Negatives

Group A—Electrified Steam Railroads—Alternating Current System—Supplementary Negatives Not Used
Group B—Electrified Steam Railroads—Direct Current System

Name of Railroad	Supplementary negative	Reason for use	Composed of	Attached to rail	Number and size of connections to rail
Baltimore & Ohio.....	Used in about 30 per cent of electric zone.	Conductivity	1-1,000,000 c.m. bare cable	7 attachments at 3 locations about 1/3 mile apart.	1,000,000 c.m. cable to neutral of impedance bonds.
Butte, Anaconda & Pacific.	Used for 20 miles on main line.	Conductivity to decrease hazard in changing rail.	1-4/0 on poles; ends connected to insulated negative from adjacent substations.	Every 1,000 ft.....	1-4/0, by means of pin driven bonds.
Canadian National, Montreal Zone.	Used with exception of 10 miles.	Conductivity, protection from broken rails.	4/0 bare cable laid in ballast in tunnels, 4/0 bare cable on poles elsewhere.	In tunnel every 1,000 ft.; elsewhere every 1/4 mile.	One 4/0, sweated into a bond.
Chicago, Milwaukee, St. Paul & Pacific.	Used	Lightning protection. Protection from high rail voltages.	4/0 cable on poles.....	Every other impedance bond.	4/0 to neutral of impedance bonds.
Long Island.....	Used in few cases..	Conductivity and signalling.	A. Old running rail laid between tracks. B. Insulated cable through interlocking plants.	At every impedance bond.	A. 2-500,000 c.m. copper cables. B. 4-500,000 c.m. cables to neutral of impedance bond.
Illinois Central	Not used.				
Michigan Central	Not used.				
New York Central.....	Not used.				
Southern Pacific	Not used.				
Staten Island	Not used.				
Rapid Transit.					
Group D—Heavy Traction Lines—Direct Current System					
Boston Elevated Railway.	Used	Conductivity	Elevated structure itself with track. In tunnels 2,000,000 c.m. bare cable used when track used for signals.	About every 700 ft.; every fifth rail bonded to elevated structure.	On elevated structure 1-4/0 wire every fifth rail. In tunnels 1-500,000 c.m. tap to rail every 600 ft.
Chicago Rapid Transit Company.	Used in special cases only.	Conductivity in one case; signalling.	800,000 c.m. w. p. cable on pole for conductivity. Scrap 80 lb. rail laid inside track in other cases.	Every 1,000 ft.....	One 300,000 c.m. cable.
Interborough Rapid Transit (Manhattan Elevated).	Used	Conductivity, signalling voltage.	Negative cable along track. Metal structure of elevated lines.	Metal structure connected to rail every 100 ft. Negative cable where required.	4-250,000 c.m. connection from rail to 2,000,000 c.m., negative cables. 1-4/0 bond track rail to structure.
Interborough Rapid Transit (subways).	Used	Conductivity, signalling voltage.	Negative cable along track. Metal structure of elevated lines.	Metal structure connected to rail every 100 ft. Negative cable where required.	4-250,000 c.m. connection from rail to 2,000,000 c.m.; negative cables. 1-4/0 bond track rail to structure.
Brooklyn Manhattan Transit Corporation.	Used in heavy traffic sections.	High voltage and prevention of electrolysis in tunnels.	2,000,000 or 3,000,000 c.m. L. & P. in duct line parallel to track. One or more used as required.	In river tunnel every 600 ft. In land tunnel at each end of each passenger station.	1-1,000,000 cable.
Philadelphia Rapid Transit Company.	Used	Conductivity; prevention of electrolysis.	Metal elevated structure. In tunnels and surface, bare cables.	On surface every 500 ft. On elevated and subway every 33 or 132 ft.	On surface cable connected to rail by 1-500,000 bond. On elevated and subway 1-4/0 bond.

information through different channels which will allow giving an unbiased report of what is being done by this method.

Information compiled by the committee on the subject of branch line electrification and self-propelled cars and locomotives includes a table of motor cars and trailers ordered previous to 1928 and brief descriptive information covering recent developments. This information has been covered by the *Railway Age*, and is therefore not included here.

Data on Articulated Trains

The report includes also tabulated data showing the extent of the use of articulated trains. At present this is limited almost entirely to suburban and city (surface and subway) lines.

Electrification progress in America and abroad is summarized by a brief review of work recently completed or now in progress.

The report is concluded by a recommendation for cooperation of the A. E. R. A. committee on heavy electric traction with the corresponding committees of the Electrical section of the Engineering division of the Ameri-

L. C. Winship, G. I. Wright, Morris Buck, secretary, J. M. Bosenbury, vice-chairman, H. F. Brown, chairman, F. H. Miller, sponsor.

* * *



Photograph by Hoag & Ford, Los Angeles.

A Warehouse for Garbanzos Which Are Grown Extensively Near Navojoa, Sonora, Mex., Along the Lines of the Southern Pacific of Mexico

Roadmasters View Problems as Cogs in Transportation Machine

Maintenance of way work is considered not only as to details but also in relation to other departments

THE forty-sixth annual convention of the Roadmasters' and Maintenance of Way Association, which was held in Detroit, Mich., on Tuesday, Wednesday and Thursday of last week, was marked by the high quality of the reports presented by the various committees, and by the interest evinced by the members in these reports, as well as in the addresses and papers presented by railway officers. The subjects covered by the reports ranged from the organization of track forces and the programming of section work to the conservation of revenue-earning equipment, and were considered not only from the standpoint of the maintenance staff, but also in their relationship to other departments. In like manner, the addresses and papers, while containing much of special interest to the maintenance man, also treated the various subjects from the broad viewpoint of the entire transportation machine.

Papers relating to maintenance of way matters were read before the convention by J. F. Deimling; chief engineer of the Michigan Central, who outlined the problems of maintaining a high-speed railway, and by C. B. Bronson, assistant inspecting engineer of the New York Central Lines, who, after describing the making of steel rails, pointed out the relation between their manufacture and their care in service. A paper was also presented by Paul Chipman, valuation engineer, Pere Marquette, which described the details of the installation of an experimental section of concrete roadbed on the Pere Marquette near Detroit, together with the results obtained from this type of construction during the 21 months it has been in service.

The officers of the Roadmasters' and Maintenance of Way Association during the last year were as follows: President, J. P. Davis, engineer maintenance of way, Central Indiana, Anderson, Ind.; first vice-president, H. R. Clarke, general inspector of permanent way, Chicago, Burlington & Quincy, Chicago; second vice-president, E. E. Crowley, roadmaster, Delaware & Hudson, Oneonta, N. Y.; secretary, T. F. Donahoe, general supervisor, Baltimore & Ohio, Pittsburgh, Pa.; and treasurer, James Sweeney, supervisor, Chicago & Eastern Illinois, Danville, Ill.

The roadmasters were welcomed in Detroit at the opening of their convention on Tuesday morning by C. G. Bowker, general manager of the Grand Trunk Western, who paid a tribute to the officers of track maintenance, particularly those who have gained proficiency by learning the work "from the ground up." The first session was also featured by the reading of a letter from R. H. Aishton, president of the American Railway Association, who has frequently addressed the roadmasters at their conventions but was unable to attend this year.

In addition to two sessions on Tuesday and Wednesday and a morning session on Thursday, the convention program included an informal evening meeting on Tuesday and the annual dinner of the Roadmasters' and Track Supply associations on Wednesday evening. An abstract of the address of Samuel O. Dunn, editor of the *Railway Age*, who was the principal speaker at the dinner, appears on a following page. The Tuesday eve-

ning meeting was devoted to an illustrated talk on safety by C. E. Hill, general safety agent, New York Central.

The report of the secretary showed a membership in good standing of approximately 900, of which 148 are new members elected during the year. The treasurer reported a balance on hand of approximately \$4,100.

At the annual election on Thursday morning, First Vice-President Clarke was advanced to president and Mr. Crowley from second vice-president to first vice-president. Elmer T. Howson, western editor of the *Railway Age*, was elected second vice-president, while Mr. Donahoe and Mr. Sweeney were re-elected secretary and treasurer respectively. New members of the executive committee are: A. A. Johnson, engineer of track, Delaware, Lackawanna & Western, Hoboken, N. J., and P. J. McAndrews, roadmaster, Chicago & North Western, Chicago. Chicago was selected as the place for the next convention which will be held on September 19-21, 1929.

The Committee on Subjects recommended the following topics for consideration and report by committees during the ensuing year: (1) The selection and training of section foremen. (2) Methods of determining and controlling cross and switch-tie renewals. (3) Develop standards of good workmanship in laying rail and recommend methods of insuring adherence to these standards. (4) The detection and correction of unsafe methods in track work. (5) Methods and costs of weed control or elimination.

Abstracts of the various reports, papers and addresses follow:

Preventing and Overcoming Damage to Rail Ends

The committee introduced its report by calling attention to the damage to rails by battering or other troubles at the joints, and recommended various precautions to be followed in the laying of new rails and the maintenance of rails in track to minimize this damage. A brief abstract of the report, which was prepared by C. F. Allen, division engineer, C. M. St. P. & P., Milwaukee, Wis., chairman, follows:

Engineers and trackmen have often raised the question why, with equal maintenance and traffic conditions and identical rail sections, some rail ends are damaged very little or not at all, while others are battered rapidly. It seems almost impossible to find a section of track where conditions are equal at all times. A roadbed of soft material makes it almost impossible to keep joints properly supported, and if this is not done, wear soon starts in the joints. One or two loose bolts may contribute greatly to the development of batter, regardless of other conditions. It is also probable that soft spots in the rail at the ends cause unexplainable batter.

In order to prevent damage to rail ends, it is essential that the rails be laid properly when new tracks are constructed, or when relaying is done on old tracks. In distributing rail, care should be exercised to group rails of the same carbon content together, especially on double track railroads, where the receiving rail may be battered. Proper allowance must be made for expansion when laying rail, this to be determined by the use of a thermometer applied on the rails at the time they are being installed.

Rail battering can be minimized by keeping track joints tight enough to develop the strength of the joint but not too tight to prevent the uniform distribution of expansion and contraction. Good maintenance with respect to ties also helps.

The percentage of rails damaged by end flow and subsequent chipping is very high. This is due to rails being too tight together, resulting in the flow of metal from one rail to another. When the rails contract on account of cooler weather, this sheet of metal is ordinarily forced out, leaving chips in the ends of one or both rails. When this condition is general over a long stretch of track, it is probable that the proper expansion was not allowed when the rails were laid, or insufficient rail anchors were applied, which deficiencies permitted the closing of the expansion gaps between rail ends.

It is the practice on some railroads to require their section men to watch for end flow and where it is noted, to cut it off during the winter months, or while the joints are open the widest. To prevent chipping, a number of roads have resorted to bevelling the ends of rails $\frac{1}{8}$ in. back from the end and to a depth of $\frac{1}{2}$ in. below the top.

The re-conditioning of rails by building up battered ends by gas or electric welding is practiced on nearly all railroads, and is increasing. The expense of doing this work depends upon the condition of the rail. The practice is more economical when the work is done before the dip in the rail at the joint is too great. It is more economical than re-sawing as it eliminates loss due to cut-offs and transportation charges and decreases the number of joints in the track.

Rail may be reclaimed by re-rolling and re-sawing at a permanent mill or by a portable saw. Where rail is to be relaid at the same location it has been found more desirable to use portable saws to saw the rail adjacent to the track, thereby eliminating transportation charges. The expense of re-sawing in this manner is not much higher than when sawing is done at a mill, while a better job of relaying can be done as a better fit can be secured at the joint than where rail is sawed at the mill and relaid indiscriminately in the track.

In many cases, batter is materially retarded or prevented by the application of re-formed angle bars or tapered rail joint shims. Inquiry among a number of railroads shows that they favor this practice; it is especially desirable before building up joints by gas or electric welding.

Discussion

Interest in this report seemed to center on the subject of making adequate expansion allowance. One speaker objected to leaving in shims for a distance represented by only 12 rail lengths behind the rail derrick or tong men, as recommended by the committee, but the prevailing opinion favored the committee's conclusions and cited objections to the practice of leaving in more shims. A discussion of chipped ends indicated general agreement in the view that this resulted from "tight rail" after end flow of the metal in the running surface had produced fins. There was some feeling, however, that failure to remove fins produced by cut-off saws at the mills was partly to blame.

The Care of Winter-Laid Rail

The committee, of which M. J. Nugent, assistant engineer, D. & H., Albany, N. Y., was chairman, prefaced its report with a discussion of the benefits gained from the growing practice of laying rail on the northern roads in the winter as an aid to stabilization of forces, thereby building up a strong personnel in the maintenance forces. Following are abstracts from the report:

The advantages to be gained by laying new rail in the winter, if this work can be done economically and well, are apparent to all familiar with maintenance problems. Are these benefits, especially on northern roads, greater than the handicaps imposed?

The principal reason for doing as much track work as possible during the cold season is because it assists materially in lightening and advancing the work of the following spring and summer; also a much more adequate and efficient labor supply is available; as many kinds of work are at a standstill, especially in the Northern states, at this time of the year. Further the traffic on most roads is considerably lighter at this season, consequently the work can be done with less interruption to traffic. The systematic scheduling of work during the winter months which can be done during that season, will permit a

more evenly balanced force allowance to be maintained during the entire year. This is an important consideration as no condition detracts from the efficiency of the maintenance of way department more than a large turnover in men, much of which is brought about by the large reduction in forces on the approach of winter. A study of maintenance of way labor payrolls with respect to the influence of fluctuating labor requirements due to so-called seasonal work will indicate, in addition to the great fluctuation in the number of men employed, an excessive labor turnover; both the fluctuation in numbers and the turnover result in many inexperienced men being employed. As proof that the turnover will be greatly reduced by uniformity in forces, a study of payrolls will again show that men comprising the minimum force remain in service throughout the year with a very limited turnover.

Therefore, in consideration of the ultimate economy of building a strong personnel, and the immediate economy of holding experienced men in maintenance of way service, as much work as is economically possible should be done in the winter, thus stabilizing forces.

Rail renewal is the most important item for winter work. There are few places in the United States where rail cannot be relaid economically in the winter. Men work with more vigor then than during the summer, thus yielding a higher performance per man day; also, section gangs can be spared from other work at this season and they can be bunched for rail laying.

In years gone by, it was generally thought by maintenance of way officers that laying rail in the winter months was detrimental to the life of the rail, and that rail should not be laid until late in the spring. Those officers who have gone into this subject extensively have been convinced that while there is certain economy in laying rail in the spring of the year, it is not sufficient to overcome the advantage of winter rail laying, with the resultant uniformity in forces and reduction in labor turnover.

Opinions of the members of the committee differ as to the cost and quality of winter rail laying but those who have gone into the matter thoroughly are satisfied that both of these factors compare favorably with work done during the summer. Others feel that while the cost in some locations may be somewhat higher in the winter, the small increase is more than offset by the advantages gained, which may be summarized as follows:

- (1)—Less delay in work and interruption to traffic.
- (2)—Stabilization of forces, resulting in decreased labor turnover and retention of experienced men.
- (3)—Any work now considered as summer work which can be transferred to the winter will permit the earlier completion of work incidental to the rail laying program.
- (4)—Productive work is provided for forces that must be retained, with experienced forces available for emergency work and better morale because of continuous employment.

Discussion

While much of the discussion of this report had a direct bearing on the care of the rail, it was treated primarily from the standpoint of the affect of winter laying on the rail, as an argument for or against this practice. The remarks made indicated a sharp division in opinion. A considerable number, although not all, of the men from roads subject to severe winter weather, were opposed to winter laying. Those taking the other side held that rail laying in winter could be carried on profitably during all but the severest weather, and that if the track were in good line and surface before the work were started no damage to the rail would result.

Organization of Track Forces

A committee, of which A. A. Johnson, track engineer, D. L. & W., Hoboken, N. J., was chairman, after recommending the adoption of some system of equating mileage in order to determine the number of men to be allotted to different sections, discussed the advantages and disadvantages of long sections, and the extent to which that problem is affected by the increased weight of track materials. A brief abstract of the report follows:

The first thing to consider in track maintenance is a proper organization. Track work cannot be performed efficiently without a suitable and carefully planned organization, together with an adequate number of the best trained foremen obtainable. The interest of the foremen in the railroad and in their

own work must be cultivated by their superior officers so that they, in turn, will require that interest in their men and thereby obtain better results from the labor expended. Foremen should be selected from men in the gangs in order to encourage industrious, capable laborers.

In recent years the weight of track materials has been increased to take care of increased axle loads and increased traffic. This increase in weight of material has taxed the strength of ordinary section gangs, of from four to six men, to the point where it cannot always be handled safely and efficiently. The weight of rail in many main tracks today is from 100 to 136 lb. per yd. and many railroads have adopted a standard rail length of 39 ft. It is very difficult for the average section gang to change out one of these heavy rails or a frog of the same section without help from a neighboring gang. To obtain such help requires time and may perhaps delay traffic while it is being secured. It is also difficult to line track of the heavier construction, particularly in stone, slag or gravel ballast, without calling for help from gangs from adjoining sections or using some mechanical device.

The lengthening of sections, with a corresponding man allowance per equated mile, may be considered as a solution for increasing the number of men per gang. On some railroads the lengths of sections have been increased after applying motor cars, but in many instances the man power has not been increased in proportion to the increase in mileage, so this has not helped the situation for them. On other roads labor-saving machines have been installed to supplant man power, but frequently such labor saving machines cannot be operated efficiently with the existing number of men per gang, and consequently the maximum amount of work is not obtained from an expensive machine, which is not economical.

One railroad has been experimenting in a few locations, during the last two or three years, with the problem of combining two sections into one and placing a section foreman with an assistant foreman in charge of a combined gang in which the number of men is equal to the number previously allowed to both sections. This gang is sufficiently large, even during the winter when all gangs are reduced, to handle one of the heavy rails or frogs. During the summer the gangs have from 14 to 18 men each and can raise track or perform other section work that might require a small extra gang or the bunching of two section gangs. This arrangement requires the protection of only one set of flagmen instead of one for each small gang at two different locations on similar work. In raising track it reduces the number of run-offs to half those that would be made by two gangs in separate locations, thereby increasing the number of feet of track raised and completed per man per day. By decreasing the number of flagmen, traffic is delayed less in proportion. Another advantage gained is that only one tool house, motor car and push car are needed in place of two of each.

The disadvantages are the inability always to obtain competent and efficient foremen who are able to supervise a large section properly in all cases, especially during severe storms, and less personal inspection of each mile of main track by the foreman. This idea is still experimental, and there is a question as to how much territory one foreman can handle economically and supervise properly.

There are other conditions that might make it undesirable to lengthen sections. Some railroads now have single-track sections from 8 to 10 miles long, and it is doubtful whether they should be made longer. On other sections there may be two or three interlocking plants which can not be supervised properly by one foreman, especially during storms. In fact, before lengthening sections all conditions should be weighed carefully to make sure that there will be sufficient supervision to take care of the work safely and economically.

The use of mechanical devices to facilitate and improve maintenance has been instituted to a considerable degree on many railroads during the last few years. In order to obtain the greatest efficiency from such tools, and thereby obtain a proper return for the money invested, they must be properly maintained and manned. To maintain such tools a proper organization of mechanics must be developed and maintained under the supervision of the maintenance of way department and subject to the call of the supervisor or the roadmaster. Power tools that do not function properly and are out of order for a considerable time are a detriment rather than a help to a railroad.

The suggestion made by the committee that certain economies might be gained by increasing the length of sections did not meet with favor. It was felt that this would result in an unfortunate reduction in the amount

of supervision and skilled inspection of the tracks which no one but the section foreman can provide. It was apparent, however, that behind the objections offered was the fear that a lengthening of sections would lead the managements of some railroads to make unwarranted reductions of forces.

The Conservation of Cars Used in Revenue Service

Economy in the use of revenue-earning cars in the handling of company material was urged by a committee, of which R. H. Smith, division superintendent, N. & W., Roanoke, Va., was chairman, which suggested that this could be accomplished, not only by prompt loading or unloading of cars containing such shipments, but also in certain cases, by the use of cars which were not adapted to commercial service. The report of the committee follows:

One of the serious burdens imposed by the rolling equipment on railroads is the transportation for distribution of the materials used in the maintenance of the roadway and structures. An idea of the size of this task can be formed by considering the distribution of the single item of crossties on a railroad of 10,000 track miles. Speaking for the average railroad, we will not be far wrong in saying that it requires two-thirds of a carload of ties per year for the maintenance of each mile of track. A 10,000-mile road would, therefore, use about 6,667 carloads of ties per year. At an average of six days for a round trip from loading point to the place of release and return to the loading point for each car in the distribution service we develop the figure of 40,000 car days for the annual crosstie distribution work on one of our larger railroads. The same railroad will use probably 15,000 carloads of first class ballast per year and must dispose of 15,000 or more carloads of cinders and refuse yearly. Much of this work must be done by cars which would otherwise be in revenue service, earning from \$5 to \$10 per day.

To its paying patrons, a railroad allows only two days free time after placement for the loading or unloading of cars, after which car detention charges are assessed. In times of car shortage much propaganda is put out and much missionary work is done by the railroads in an effort to get shippers to utilize or release equipment in less than the legal time allowance.

It is, therefore, incumbent on a railroad, not only as a matter of consistency, but in order to conserve its equipment for its revenue-yielding service, to speed up as far as is possible and economical the movement of equipment engaged in its material-handling work.

The main bulk of track maintenance material moves in solid carload lots and each car should be billed direct to the supervisory officer directly responsible for the distribution and use of the material. To save delays at junction points or in yards awaiting reconsignment it should be billed direct to the station at which it is to be unloaded or from which it is to be distributed. The agent at the receiving station, upon receipt of a car of company material, should immediately wire the consignee to whom the car is billed, giving the car number, initials and contents.

Where possible (and it is usually possible), a maintenance supervising officer should place unloading instructions for each carload of material in the hands of his unloading foreman, before the car arrives. On receipt of the arrival advice, he can follow up by wire the carrying out of these instructions or issue instructions where this has not already been done.

The time-honored practice of having cars of material billed from the manufacturer to a general officer of the railroad at a junction point or yard for reconsignment, and the passing down of unloading instructions through various officers, by letter or message after the car has arrived at destination, is productive of great unnecessary delay and should be avoided. By a little more thought and pains in the office which places the order, final destination billing instructions can be sent to the originating point of practically every carload of material, unnecessary delays in transit saved and the starting of unloading expedited.

Another economy can be effected by selecting, for company material loading, classes of cars not in active demand for revenue service at the time the shipment is made. For instance,

most railroads own a considerable number of stock cars. The demand for these cars in revenue service is ordinarily limited to a short season each year and during the balance of the time the cars are a drug on the equipment market. Yet stock cars are well suited to the handling of crossties and lumber, which can be handled to a large extent in other than the live-stock movement season.

Some railroads have effected economies by fitting up and assigning to company material service, cars which are no longer fit or suited for revenue service. One line, for instance, met its cinder and refuse handling requirements by withdrawing from its coal-handling service and assigning to cinder and refuse service, about 800 old composite wood and steel hopper cars which had about outlived their usefulness in heavy-train, tonnage coal service, but which were still good for many years use in local-freight and work train service. These cars had a depreciated book value of about \$250 each, but they handle engine cinders equally as well as new steel hopper cars carried at a book value of \$2,000. Thus, there is a difference in capital carrying charge of \$105 per year per car, a worth-while saving. The sight of a new steel car with its sides warped and the paint blistered by loading with hot engine cinders is a reminder that less expensive equipment might be used with greater economy in that service.

In the same manner old steel-underframe gondolas or box cars can be cut down at small expense and converted into very satisfactory maintenance-of-way or work-train service flats, certain number of which are a necessity on every road. Most lines have a considerable number of side-dump cars for construction or grade revision work. When not engaged in this work they can be used to good advantage for cinder and refuse handling, particularly when the material is to be used for bank widening.

As far as practicable, supplies should be purchased or handled in carload lots, as the cost per ton for handling and the number of cars required for the total service is less than when the supplies are moved more frequently in smaller lots. In the movement of the major track materials—rails, ties and ballast—frequent checks should be made to see that cars are being loaded to their maximum weight or cubical capacity. In many cases we have educated our shipping patrons considerably more than our own employees in this respect.

In the actual handling of cars for the unloading and distribution of the material where it is to be used interesting problems present themselves. Where the material is to be scattered along the track and only one or a very few cars are to be handled it can often be done without delay or excess cost by the local freight, the cost of which, per hour of service, is very nearly the same as a work train. Where rails or many cars of other supplies are to be unloaded, work-train service is usually more satisfactory and economical. When the distribution is to be made within a limited distance from a siding, it is often more economical to unload at the siding and distribute with push cars or motor cars and trailers. When there is little difference in the labor cost the method should be selected which will effect the most prompt release of the car.

While we have been referring to the unloading of cars, it must be kept in mind that it is just as important, from the standpoint of car conservation, to load and move a car promptly after placement as to unload it without delay at destination. Intelligent loading can do much to reduce the number of cars necessary for any service. Small-lot shipments from central supply points should be made in trap material cars to be unloaded as the car progresses, or, if there is not sufficient material to justify a car, they should be made as ordinary l.c.l. shipments. The general use of regular supply cars for handling small tools, oils, stationery and similar supplies is for the purpose of expediting and reducing the cost of distributing this class of small-lot supplies.

Greater Use of Motor Cars

With the improvement and more general use of motor cars a considerable reduction in the cost of distributing crossties and other material has been effected, particularly on lighter-traffic and branch lines, by the extended use of motor cars with trailers for assembling material at sidings or distribution points or for distribution from sidings. A work train or a local freight at a cost of from \$10 to \$15 per hour of service is an expensive luxury.

Stress should be laid on the importance of specifying the kind of car wanted on an order. A shipper of 40-ft. piling, for instance, would not order simply a gondola or a flat car and take a chance on getting one of the right length. Yet cases have been noted where flatcars were ordered, assembled and equipped with side stakes for loading rail and then it was found that the rail was all in 39-ft. lengths and some of the cars were of the 36-ft. class.

The average maintenance-of-way supervisory officer has been trained to look with horror upon an idle man in his forces. If he will get clearly in his head the fact that a railroad's freight cars bring in the greater portion of all its earnings, and will learn to look upon an idle or unproductively-employed car with the same disfavor that he regards an idle or wastefully employed man, it will be the equivalent of adding many expensive cars to his road's equipment.

Discussion

Comments on this report were confined primarily to an earnest discussion of the apparent lack of consideration given to convenience in unloading, when cars are assigned to the transportation of company materials. Particular objection was raised to the use of stock cars and high-side gondola cars for hauling ties, although a number of speakers supported the committee's recommendation that such cars be used in this service where the movement is the reverse of the normal direction of revenue traffic.

The Programming of Section Work

The importance of a well-considered program of maintenance work as an aid to economy and efficiency was stressed by a committee, of which J. J. Desmond, roadmaster, I. C., Chicago, was chairman, and the details to be observed in the preparation of such a program were discussed in its report, a brief abstract of which is presented herewith.

To attain the highest degree of efficiency and to insure the maximum economy in railway operations, a great deal of the work must be carefully planned beforehand. This applies with particular emphasis to the departments which are charged with the maintenance of the roadway. The need of adopting and adhering to an intelligent working program in maintenance work is generally recognized.

The maintenance engineer, the roadmaster, the road supervisor and the track foreman are each in a position to render valuable aid in this direction. In mapping programs and formulating budgets for maintenance work the maintenance man is guided largely by his own experience and by the practices of others in whose ability he has confidence. Every person engaged in maintenance work should be able to contribute some helpful suggestions toward effective planning and efficient practice.

For one thing, the tendency toward the use of heavier and more modern equipment, especially on the mainline divisions, is a factor which must constantly be born in mind in efficient maintenance planning. We have all encountered numerous instances where heavy expenditures could have been avoided or postponed, if future developments in this direction had been anticipated.

The difficulties frequently experienced in obtaining from the management sufficient appropriations with which to carry on what seems to be necessary work comprise a problem that each one must work out for himself. It must be borne in mind that the management is entrusted with the task of operating the railroad in the most economical and efficient manner possible and that there are many demands upon the monthly allotment. The problem is to make the most of one's allowance, whatever it may be. This calls for the most careful planning, not only for the current month but for several months in advance.

The largest expenditure for any class of material used in the maintenance of way department is for ties; and since most railroads now use creosoted ties, the initial cost is much greater than it would be if untreated ties were used. Therefore, economy demands that the full service of a tie be secured before it is removed from the track. The renewal of ties has been carefully scrutinized, and most railroads now keep a record of those renewed on each mile of track each year. A comparative statement of this kind is an important aid in checking the renewal of ties, and supervisors should see that section foremen are given this information. Ties removed from track should be carefully inspected. Those which can be used for sidings, yards, repair tracks, etc., should be segregated and made ready for movement whenever needed. Those which can be used for engine wood or other fuel purposes should be handled in a similar manner.

The greatest efficiency can be attained and objectionable fea-

tures can be reduced to the minimum if the roadmaster, the supervisor and the section foreman will confer frequently, plan carefully and adhere as closely as possible to a carefully prepared seasonal program. By avoiding haphazard methods in ordering materials and labor, many of our difficulties will be overcome and greater efficiency will result.

Discussion

Several speakers expressed doubt as to the possibility of preparing a program that could be adhered to with reasonable accuracy throughout the year, and emphasized the necessity of meeting the changing conditions arising from floods, etc., as they arose. For this reason some favored a monthly rather than an annual budget. In reply to a question regarding the tangible benefits of programming, Chairman Desmond stated that his road had found this plan an incentive to industry, by keeping the work to be done definitely before the forces.

Permanent Concrete Roadbed On the Pere Marquette

By Paul Chipman

Valuation Engineer, Pere Marquette, Detroit, Mich.

[A description of the installation of this appeared on page 129 of the January 14, 1928, issue of *Railway Age*. An abstract of that portion of the paper relating to the results obtained in service are appended.—Editor.]

This piece of track has now been in operation 21 months, and in that time we have learned a number of things. One of these is that no metal rail seat is necessary, as there has been no wearing away of concrete under the rail, at least not in a measurable amount. Neither has there been any disintegration, even though one rail rests directly on the concrete.

There is very little batter of the usual type, probably less than ordinary track would acquire in the same length of time and under the same traffic. There is, however, more or less of what the street railway men call "cupping", a type of batter that is found on very hard stone ballasted track, elevated railroads, and rigid tracks in general. This consists of a depression which begins 3 or 4 in. from the receiving end of the rail and extends for 10 to 15 in. in the direction of traffic.

The only anchorage of the rail on the slab is that afforded by the clips that hold it down. This is not enough to prevent creeping. The rails on both the approaches are thoroughly anchored, and since this was done, creeping has been reduced to a forward movement caused by traffic and a backward movement due to expansion, with a maximum movement of perhaps two inches.

Insulation Under One Rail

The north rail, for its entire length, rests on pressed-wood insulating fibre $\frac{3}{8}$ in. thick. This was installed last January for the purpose of insulation, but the behavior of this rail indicates that some such separation has advantages other than those of insulation. This rail does not seem to move up and down as much under traffic as the other one. Such a layer seems to give the clips a chance to grip the rail more tightly. It also serves to protect the concrete from any possible abrasion, and perhaps also tends to lessen the noise of passing trains.

The track rides very smoothly, as it has since operation began. In riding over it there is the slight feeling of rigidity that is felt on a viaduct or street railway where the rails have a rigid bearing. There is a sound resembling that heard in passing a freight train, but not so loud, and which is due to the reflection of sound caused by the grinding of the wheels and the friction and rattling of equipment. However, the joint clicks, which are the greatest noise-making factor on ordinary track, are not heard; so that, on the whole, the noise is probably not more than on ordinary track.

There has been some settlement, but it has been remarkably uniform. The entire slab has settled an average of about $\frac{1}{2}$ in. since operation began. About $\frac{1}{2}$ in. of this occurred during the first few days of operation, and in this period practically all the unevenness of settlement also developed. There was a further settlement which averaged about $\frac{1}{4}$ in. during the following winter months. From April, 1927, to December, 1927, no settlement took place, but levels taken in April of this year show an additional settlement which averaged about $\frac{1}{4}$ in. The difference in the amount of settlement of adjacent

slabs is so slight that it cannot be seen with the eye and has no effect on the riding qualities of the track. No heaving by frost has occurred, as the slab rests on top of the old ballast and the drainage is good, with an open ditch on one side and a six-inch tile drain on the other. Some measurements were recently made of the amount of settlement under a locomotive. A switch engine weighing 204,000 lb., all on the drivers, was used and the deflection at each joint between sections was observed with a wye level at close range. This deflection was found to be remarkably uniform and averaged 0.08 of an inch.

Last July some tests were made to determine the comparative resistance of the track on the concrete roadbed and on the adjacent eastbound track. These tests were made by kicking cars over both tracks and measuring the reduction of velocity. From this, the resistance on both tracks was computed and it was found that the track on the concrete roadbed had about 0.8 of a pound per ton less resistance than the track of ordinary construction. This is equivalent to about 16 per cent of the resistance on level track. This method of determining the resistance was used because the experimental section is too short to accomplish much by the use of a dynamometer car. The methods were rather crude and it is hoped that the results can be verified later by more thorough and extensive tests.

The only expense incurred for maintenance thus far, has been due to things which may be entirely avoided by an improved design. A few of the clip bolts have been broken, as only $\frac{3}{4}$ -in. bolts were used, whereas they should have been $\frac{7}{8}$ in. or perhaps even 1 in. The breaking of these bolts occurred principally at the ends of the section, where, on account of the change from ordinary track construction, there is more vertical motion of the rail than elsewhere.

To Build An Additional Unit Later

We are not giving this piece of track any special care, but are watching it and studying its behavior under ordinary conditions with a view to improving the design. At the beginning of this season, it was the intention to build an additional section, but it was decided to keep the present section under observation for another year before doing so. Many improvements can be made. As a metal rail seat has been found to be unnecessary, the design can be greatly simplified, eliminating structural steel and doing away with the need for special insulation. In the present installation not much consideration was given to economy of design and more strength was provided than was thought really necessary. Further, a more economical disposition of both concrete and reinforcement is possible. The cost of the short section installed is not much of a guide to what the cost would be with modern facilities for doing the work on a large scale. It is believed, however, that a design can be worked out that can be built for \$40,000 or \$45,000 per mile, including fastenings, but not including rail.

In addition to developing a design that can be installed at a reasonable cost, it is essential that some method be developed for restoring the roadbed to its original grade in case of unequal settlement. Although settlement of the present section has been slight and very uniform, we cannot hope that this would be true in all locations. In the present installation pipes were imbedded in the concrete through which dry sand or grout could be forced under the slab with compressed air after the slab had been lifted to proper grade by jacks or crane. There has been no occasion to try this out, nor is there likely to be on the present installation; neither is it probable that this process would be necessary, except at long intervals and over short stretches. However, we believe that something of this kind is essential to the success of a roadbed of this type, and expect to make some experiments along this line.

There are so many unknown factors involved, that a satisfactory roadbed of this type must be developed by a process of trial and error. This will take time and it will require still more time to measure the economy that will result from its use. There has been nothing thus far to discourage us in the belief that eventually a roadbed of this type will be evolved, which will not only be satisfactory as to performance, but will result in a saving that will justify its cost of installation on heavy-traffic roads.

Essentials of a High-Speed Track

By J. F. Deimling

Chief Engineer, Michigan Central

Following a brief outline of the history of the Michigan Central, in the course of which he made some interesting comparisons of the track standards of the past

and present, Mr. Deimling presented a description of the standards of roadway and track construction followed on the heavy-traffic, high-speed lines of that road. This part of his paper, together with the portion dealing with organization and methods is abstracted below:

The first necessity of a good railroad is drainage; it cannot be good without drainage. We are and have been spending much labor and material for adequate drainage and gradually we have drained practically all our cuts with tile of various kinds; in the summer we also keep the ditcher continually at work, ditching the cuts and widening the banks to maintain an adequate foundation for the ballast. These things are of first importance in getting a smooth riding track. On our Canadian division, where we have a heavy clay soil to contend with, we find the so-called "French drain" of great help. At track pans, drainage is especially necessary and difficult at such points, and we use longitudinal tile drains between tracks for the entire length of the pan with frequent cross drains of corrugated perforated steel pipe connected with catch basins.

All bridge decks have ballast floors with regular track ties, enabling the trackmen to surface the track as at any other place. These measures are not new, but they are refinements that help very much in preserving line and surface of good riding track.

We have a minimum of 12 in. of $\frac{3}{4}$ -in. to $2\frac{1}{4}$ -in. stone ballast, the contour of which is 4 in. below the tops of ties at the ends and slopes to a neat line 5 ft. beyond the rail. We require the trackmen to keep this line true, and furnish them with templates so that they can maintain it uniform. Neatness is of vastly more importance than merely appearance. It has the effect of drilling men in being neat in all other kinds of work. The actual cost is comparatively small, but it pays a large return in the way of discipline and training.

Our ties are largely red oak, creosoted at our Toledo plant, which is operated under contract with the Federal Creosoting Company. The ties have a 9-in. face, are 7 in. thick and 8 ft. 6 in. long and are adzed and bored at the plant. This insures a level surface for the tie plate and is of much benefit in giving a full bearing for the plate and the rail, and eliminates adzing which is so destructive.

Our ties are all plated with wrought iron shoulder plates, 7 in. wide by 11 in. long, with a minimum thickness of $\frac{3}{8}$ in., inclined 1 in 44 and 1 in 20, with a so-called waffle-iron bottom, the ribs being $\frac{5}{32}$ in. deep; these plates weigh 13.4 lb.

The New York Central Lines use the Dudley section rail developed by the late Dr. Dudley. The 127-lb. section is our standard for main-line use. The design of the joint has kept pace with the rail. Our angle bars are 38 in. long with 6 bolts, $\frac{7}{8}$ in. in diameter, with Harvey Grip threads. In highway crossings and station platforms, we have derived much benefit from welding the rail ends with the acetylene torch, making a continuous rail through the crossing, the angle bars being applied in the usual way.

Experience With Contract Work

For many years, we have made our rail and ballast renewals by contract, with entirely satisfactory results. The contractor worked under a detailed specification and furnished the entire organization, including superintendent, foremen, laborers, tools and camp equipment, the railroad delivering the material at the exact place required. An experienced track foreman was with each gang all the time as an inspector, and also to see that the flagging was properly done as well as attending to the safety of the track. All the work was done without delay to traffic, other than a slow order of 30 miles per hour. A greater quantity of work per day is accomplished by this method for the reason that the program is not interrupted, as is often the case where company extra gangs are used, and the number of men employed is more uniform and regular. Also, the regular track gangs are not taken off their routine maintenance work. The contract work is paid for on a unit price basis. I am sure that this method is the most satisfactory one for making large rail and ballast renewals, and is more economical than the usual one; we have used it for about 20 years.

Generally, the cost of maintenance is divided, 44 per cent for material and 56 per cent for labor and the proper application of the two gives one result—good track. Good material can always be purchased, but good labor is not so easily delivered. Men must be recruited, trained and led with great patience and firmness. This is called supervision and is the task laid out for you and me. The amount of skill, common sense and general intelligence that is put into the supervision largely determines the result. To me one thing is certain. Ordinary brute force will not do it, but marvelous results are attained by co-opera-

tion between the laborers and the foremen, and between the foremen with the roadmaster.

The greatest force in the world is the will to serve. When it is born of enthusiasm, it is dynamic in its intensity. When it emanates from a sense of duty, it endures. In our own case, we are fortunate in having an organization that has a long service record. A section foreman was retired a short time ago who had been for 50 years on a main line section of track, carrying very heavy traffic, and he was as alert mentally and physically on the day of retirement as he was when many years younger. Such men are the firm foundation of good track. Our 32 roadmasters have an average service of 31 years and our assistant roadmasters, 26 years. Over 100 of our foremen have over 20 years service. Our foremen are required to work with and lead the men; we regard this as an important practice.

Manufacture and Service of Rail

By C. B. Bronson

Assistant Inspecting Engineer, New York Central Lines.

The relationship between the manufacturer of rails and the service to be obtained from them in track was discussed in a paper read before the convention by C. B. Bronson, assistant inspecting engineer of the New York Central Lines. Mr. Bronson presented an interesting description of the manufacture of open hearth rails, followed by a review of the trend toward heavier rails and the efforts being made to improve their quality. He also discussed the influence of service conditions and the care of the rail in track on its service life and reviewed current knowledge of the cause of rail failures. These latter portions of his paper are reviewed below:

Care of the Rail in Track

The method of installation is of decided importance. New rails have a degree of surface softness from the setting of the steel in the molds, and the action of the soaking pit gases surface decarburization. The metal is susceptible to flow, particularly ahead of the time when the cold rolling action of the wheels densifies and hardens this surface. It is essential that the expansion allowance between rail ends be adjusted correctly, and it is decidedly important that this surfacing and spacing of ties follow immediately, if possible, after the installation of the rails, or with a minimum of delay, to avoid battering and flow at the rail ends, the development of chipping, and the spotty and erratic side flow of the rail heads, which is frequently noted. Many of the difficulties encountered with bad ends or joints are due in large measure to neglect of new material after installation. So far as the head surface metal is concerned, it needs more attention during the period following installation than after cold rolling has developed on the bearing surface.

If end flow develops between the opposite adjoining rails, and indications of chipping are apparent, it is advisable to either chisel or preferably grind out the thin layer of overhanging metal. It is frequently the case that deeper and larger shelled-out spots occur which could easily have been avoided. More rails are renewed yearly and have their service shortened by reason of battered and chipped ends than from any other cause, thus constituting this as one of the major problems in maintenance work on rails.

Wear of rail heads on tangent tracks is a minor factor in renewals, compared to the major problem of difficulties with rail ends. The loss in head depth on tangent track under heavy traffic averages close to $\frac{3}{32}$ in. in 10 years, and the rail would still have many years of service, if it were not for the condition of the rail ends.

Curve wear is virtually a separate problem and is met in a number of ways. The simplest is the installation of blue end or higher carbon rails within the range specified, which add somewhat to resistance to abrasion. Medium manganese rails are proving advantageous for the same purpose. The most successful material is 10 per cent to 15 per cent water-quenched manganese steel, but the cost is too high for general installation. This material is free from the general types of failures, but has one deterring feature in that it acquires permanent sets due to its low elastic limit and lack of resilience, and is useful practically only in slow speed service. Nearly all recent test installations of heat-treated carbon rails have been on sharp curves, where the reports indicate a considerable increase in life compared to the same material untreated.

Rail Failures

Another important phase of rail maintenance with which the roadmasters are concerned is that of rail failures. The extent of this problem varies, depending upon traffic conditions and the plant from which the rails were purchased. The rate of failure, particularly of certain types, varies considerably between mills.

The base, half moon, and web failures, which were numerous in Bessemer rails, have so diminished in open hearth steel as to be of minor importance. Investigation of numerous broken rails has shown that a majority had their origin at seams in the base. Other broken rails are due to slippage or burned spots on the bearing surface, and develop downward through the section.

Failures in the web at the bolt holes are associated almost entirely with joint maintenance conditions. Cracks develop at the edge of bolt holes under constant pounding on the rail ends and progressive fractures result. This failure is prevalent for suspended joints with short angle bars. Experience extending over a quarter of a century with the three-tie joint and long angle bar has demonstrated that such failures are a small fraction of one per cent for all weights of rail from 80 lb. to 127 lb. per yd.

Head failures are of two general types, crushed and split. Both have a common origin in the weakness of segregated or unsound steel, and are more prevalent in "A" than in lower rails of the ingot. The crushed head is a local flattening and distortion laterally of the head metal and is troublesome but not serious. Confusion still exists in differentiating between split heads and piped rails. Several roads report piped rails as their principal problems when such failures are of rare occurrence. The difficulty lies in the apparent similarity of the two defects. Pipes are located in the web and partly in the lower portion of the head. Split heads have their origin just beneath the bearing surface, and travel downward causing a widening of the head, and a hollowing out of the bearing surface, and leaving a dark streak on top; in advanced stages they appear as cracks in the fillet underneath the head. Advance information of impending failure is thus indicated and such rails can be removed long before complete rupture develops.

Interior Transverse Fissures

Interior transverse fissures are head failure developments of a more troublesome nature because they give practically no indication of their presence in the interior of the head. Discussion of this defect has continued for the last 17 years, and large sums of money have been expended in research and investigation into the origin and cause. The conclusions are far from being unanimous except that the interior metal is brittle low in physical qualities, and has been injured by some force which creates the nucleus origin. The shiny surrounding surfaces are universally recognized as a development in service from the wave motion and reverse bending under traffic. The debatable point is the reason for rupture of the nucleus. Mill conditions undoubtedly have an influence, for rails on heavy freight and passenger lines, manufactured at certain mills, are largely immune, while failures occur on lighter traffic lines in rails from other plants.

Fissures remained undetected in the rail until fracture occurred, until E. A. Sperry recently developed the detector which bears his name and which has solved the problem. The size and location of even the smallest fissure are now known with a degree of exactness which seemed unbelievable at first. Actual road tests are under way and within a brief period equipment will be available for more general use.

Samuel O. Dunn Discusses

The Railroads' Competitors

After stressing the importance of adequate roadway facilities, properly maintained, in the rendering of railway transportation service, and reviewing the marked progress made by the railroads since 1920 in increasing the traffic capacity and effectiveness of its fixed properties, Samuel O. Dunn, editor of the *Railway Age*, who was the speaker at the annual dinner, discussed the problem now confronting the railways by reason of the growth of competing forms of transportation. His remarks were in part as follows:

The inconsistent attitude of the public, business men and regulating authorities regarding transportation matters presents to railway managers a dilemma so serious as to create a national problem of the first magnitude. The public constantly demands more reliable, speedy, safe and even luxurious railway service, and at the same time constantly supports government policies which make it more and more difficult for the railways to render the kind of service demanded.

No better illustration of this could be given than is afforded by developments that have occurred within recent years and are still occurring. When the railways were returned to private operation in 1920 their properties were in an unsatisfactory condition and their service was inadequate and unreliable. There was a strong public demand for a great improvement. The tracks and other permanent structures of the railways represent the bulk of the investment in them, and unless they are adequate and in good condition, it is comparatively futile to try to render good service by improving locomotives and cars or adding to the number of them.

"In carrying out their program of rehabilitating the properties and improving their service, railway managers have, therefore, devoted great efforts and expenditures to the betterment of roadways, tracks, signaling and other permanent property. The new investment made in these permanent facilities within the last six years, exclusive of that made in locomotives and cars, has been about \$2,500,000,000. In addition, the annual expenditures made for the maintenance of these permanent structures has been increased from about \$422,000,000 in 1916 to about \$865,000,000, or considerably more than 100 per cent. The improvements have been greater on some railways than on others, but they have been made on railways throughout the country and have been of every conceivable kind. Rail in main line tracks weighing 85 to 90 lb. per yd. has been largely replaced with rail weighing 110 to 130 lb. Many thousands of miles of line has been newly ballasted, and on other lines stone ballast has been substituted for inferior material. A huge expenditure has been made to eliminate curves in tracks and to reduce grades. The mileage operated under the protection of block signals has been greatly increased. Bridges have been strengthened. The drainage of road beds has been improved. Indeed, tracks and other structures used in the operation of trains have been so bettered and strengthened that it has become possible all over the country to use heavier and more powerful locomotives, to haul longer trains and to operate on reliable schedules at increased speeds with a remarkable increase in safety of both employees and passengers.

Advantage of these improvements in tracks and other facilities has been taken by the railways greatly to speed up their service. Long freight trains consisting of freight cars carrying fruits, vegetables and other perishables are now moved on regular schedules at speeds which formerly could be attained only by passenger trains. The average speed of all freight trains has been increased 25 per cent. The speeds of many passenger trains in all parts of the country have been increased and their 'on time' records have been improved.

Has the public shown appreciation of this improvement in railway properties and service? It has, by expressing approval of the service, but not by indicating any willingness to pay rates for it proportionate to its quality and value. In spite of the improvement in service, a very large part of the local passenger business of the railways has been diverted to motor vehicles, and although there has been a large increase in the amount of travel in sleeping and parlor cars, there are still demands for legislation to deprive the railways of the \$40,000,000 in revenues derived by them annually from the so-called 'surcharge' for travel in sleeping and parlor cars. The passenger business of most railways is now being handled at a loss, and those who persistently demand that the surcharge shall be abolished are demanding that it shall be handled at a still greater loss.

The situation as respects freight transportation is similar. Transportation by inland waterways would be much more expensive than by rail if the cost of providing and maintaining the waterways, as well as the rates paid by the shippers, were considered. It would be much slower and it could not be rendered at all in the northern parts of the country during a large part of the year. Nevertheless, there is widespread agitation for the development of inland waterways to divert traffic from the railways. Furthermore, there is constant and effective pressure for reductions of freight rates, especially on the products of agriculture and other industries which it is claimed are in a condition of depression.

The result has been that the railways have not earned a fair return either upon the investment they previously had in their properties, or even on the large investment made within recent years in these improvements.

Frisco Reduces Rough Handling and Claims

Investigations of each individual case and definite fixing of responsibility aid campaign

THE freight loss and damage claim bill of the St. Louis-San Francisco for 1921 amounted to \$1,172,696, or \$1.99 for each \$100 of gross freight revenue. In 1927, the bill was reduced to \$489,369, or \$0.70 per \$100 gross freight revenue. This represents a saving of \$683,327 per year, or \$1.29 per \$100 gross freight revenue.

During 1924, there were 2,114 cars roughly handled, on which the cost of repairs amounted to \$70,632. In 1927, there were 850 cars damaged by rough handling, the repair costs amounting to \$36,616. This represents an annual saving of \$34,016, or 48.1 per cent, in repairs alone, and a reduction of 59.7 in the number of cars damaged. The performance for the first six months of this year shows a still further improvement. Among the notable performances in this connection is that of the Western division. During the first six months of 1926, there were 15 cases of rough handling chargeable to this division, involving \$1,857 in repair costs, out of 122,590 cars handled. In the same period of 1927, when 123,531 cars were handled, only one car was roughly handled, which was repaired at a cost of \$5. This year, from January to June inclusive, 116,089 cars were handled on the Western division and there were no cases of rough handling at all.

These results were obtained by the inauguration of all-year-round campaigns, by the development of a spirit of competition, by the increased loyalty and correspondingly increased efficiency of the men, and, above all, by the complete cooperation of the freight claim and operating departments. This was aided by the fact that departmental lines are not rigidly drawn on the Frisco. The claim prevention and rough handling campaigns have the same general object in view; accordingly, each is fostered as much as possible by both the freight claim and operating departments.

Loss and damage claims and overcharge claims are handled by entirely separate departments on the Frisco. Feeling that loss and damage claim prevention was largely an operating matter, the office of the superintendent of freight loss and damage claims was established at Springfield, Mo., the operating department headquarters, while the overcharge claim department, being entirely an accounting department matter, is at St. Louis.

The activities of the superintendent of freight loss and damage claims and his assistant are supplemented by five traveling loss and damage claim inspectors. These men handle claim prevention in general, during the entire year, but their services are particularly valuable in reducing claims on seasonal traffic, which is often highly perishable. The rotation of these movements, beginning with the first of the year, is as follows: cattle, radishes, strawberries, potatoes, early apples, peaches, wheat, melons, cantaloupes, grapes, late apples, cotton.

Special circulars are issued covering the movement of these commodities just before each movement begins. These circulars are supplemented by the visits of claim prevention officers who give personal instruction and aid to the employees actually handling the

shipments. In this connection, the reference file that has been accumulated in the claim prevention headquarters is found to be valuable. This file was established some years ago. Separate files are maintained for each commodity that the Frisco handles in any quantity. Carbon copies of all correspondence pertaining to the handling, or mistakes in handling, of any of these commodities are placed in the file reserved for that commodity, so that now, the file on cotton, for example, has become a complete reference work on what to do, and equally important, on what not to do in the handling of cotton. This care and attention to carload traffic, coupled with the continuing campaign against rough handling, which is described later, have had the effect of reducing materially the claims on carload traffic.

It will be noted, in connection with all claim prevention campaigns on the Frisco, that generalities are avoided as much as possible. It is felt, and the results obtained have borne out this conclusion, that the true sphere of freight claim prevention is in dealing specifically with individual cases. The system of notifying the superintendent as to claim conditions on his division is an example of this. Instead of merely advising the superintendent of the amount of loss and damage chargeable to his division, or some other similar generalities that would give him no opportunity to correct conditions, each case that results in damage of any considerable amount is handled individually. When the claim investigator has the complete record available, a letter is written to the superintendent giving all the details and asking that he admit responsibility on behalf of his division. Extra copies of these letters are made, which are assembled once a month, placed in division order and submitted to the general manager, who is, naturally, much interested in claim prevention and has taken a leading part in furthering it.

The loading, unloading and proper paper work on less than carload traffic has also been made the subject of intensive study and action. The results of this are apparent in a resume of errors made at stations, which shows that, during January, 1925, there were 730 such errors made, compared with 670 in January, 1926, 517 in January, 1927, and 423 in January, 1928. This improvement has been made permanent. In May, 1928, for example, 428 errors were made, as compared with 513 for the same month of 1927, and 409 for April, 1928, compared with 513 for April, 1927.

In handling these errors, as in handling loss and damage on carloads, generalities are avoided, individual cases are called specifically to the attention of the agent, and he is required to make a satisfactory explanation, or admit the error.

For the purpose of stimulating interest and rivalry, pennants are awarded each month to the leading stations in each of three classifications. These three groups include all of the principal stations and merchandise transfer points, arranged so as to include in the same group stations handling, as nearly as possible, the same amount of business.

Group 1 consists of Tulsa, Okla., Memphis, Tenn., Springfield, Mo., Kansas City, St. Louis-Broadway and St. Louis-Seventh Street. Group 2 comprises Oklahoma City, Okla., Hugo, Birmingham, Ala., Joplin, Mo., and Fort Smith, Ark. Group 3 includes Fort Scott, Kan., Pittsburg, Wichita, Chaffee, Mo., Jonesboro, Ark., Okmulgee, Okla., Enid and Muskogee.

A complete record of the performance each month is mailed to the agents, and to the superintendents as well. Table 1 shows the record made by the stations included in the three groups during May, 1928. It will be observed that 3,427 shipments were handled at Tulsa, Okla., to each error, while the average for the six stations in Group 1 was 2,238 shipments per error. The five stations in Group 2 averaged 2,331 shipments per

visional reports also show in detail errors made at stations not included in the three classifications mentioned above.

When it was decided, in 1923, to make a determined effort to reduce rough handling, it was also decided to confine the activities almost entirely to individual cases. This seemed to promise greater results than dealing with the problem in general terms, and this theory has been borne out by the success attending the campaign. It was also felt that the direction of the campaign should be in the hands of some one operating officer, and the assistant to the general manager was, accordingly, put in charge.

In order to facilitate the investigation of each individual case, a special report of cars damaged in the

Table 1.—Monthly Station Error Statement

Stations	Error in Billing	Error in Handling	Failure to Unload	Mishandling Waybill	Total	Number Tickets Billed	No. Tickets Billed to Each Error	Shipments Handled	Shipments Handled to Each Error
Group One									
Tulsa	11	6	0	4	21	7,964	724	20,559	3,427
St. Louis, 7th St.	15	16	0	19	50	27,552	1,837	44,705	2,794
Springfield	9	11	0	3	23	10,593	1,177	27,888	2,535
Kansas City	34	15	0	0	49	38,371	1,129	35,161	2,344
St. Louis, Bdwy.	6	13	0	3	22	9,599	1,600	18,992	1,461
Memphis	17	46	0	2	65	20,405	1,200	39,977	869
Group Two									
Hugo	0	1	1	3	5	309	309	4,126	4,126
Joplin	4	2	0	1	7	3,029	757	5,274	2,637
Birmingham	2	6	0	1	9	5,309	2,655	14,289	2,382
Oklahoma City	13	9	0	0	22	10,264	790	16,923	1,880
Ft. Smith	7	9	0	1	17	3,548	507	5,664	629
Group Three									
Ft. Scott	1	0	0	0	1	539	539	2,091	2,091
Pittsburg	1	0	1	0	2	583	583	1,557	778
Chaffee	0	1	2	0	3	413	413	3,308	3,308
Wichita	3	1	9	0	4	1,761	587	3,161	3,161
Okmulgee	2	2	0	1	5	1,120	560	3,390	1,695
Enid	2	5	0	1	8	1,144	572	3,978	796
Muskogee	0	4	1	0	5	974	974	1,992	498
Jonesboro	1	8	0	0	9	1,018	1,018	3,919	490

error, Hugo, Okla., leading with 4,126. Group 3, comprising eight stations, averaged 1,802 shipments per error, Chaffee, Mo., leading with 3,308.

A monthly summary is also prepared of the errors made at stations, arranged in terminal and division order, so that each division and terminal superintendent has a comparative record of the showing made by the stations under his jurisdiction as a whole. These di-

yards was devised. The information in this report includes the place where the damage was caused, the date, the number, type and initials of the car, the yard location and the time. The contents and damage are also shown, together with the estimated damage to the car and a full explanation of the cause of the damage.

This report is rendered daily by the car foreman at each terminal or intermediate point where a car man is



The Champion Freight Handlers—Freight Station Force at Springfield, Mo., Holders of the Frisco Record for Three Years

employed and it covers every car that bears evidence of having been roughly handled. Copies of this report are forwarded to the yardmaster, the master mechanic, the superintendent or terminal superintendent, the superintendent of motive power, the general manager and the operating department statistician.

Each case is then investigated without delay, and the responsibility placed by the division or terminal superintendent. In view of the alacrity with which each case is handled, it is possible to apply corrective measures at the time when they will do the most good. The assistant to the general manager follows up each case with the superintendents to secure the results of the investigation and to discover what action was taken to prevent a recurrence.

Several impact recorders were purchased in 1923, constructed and designed so as to show the intensity of the impact, as well as the hour and date it occurred. Through the use of these recorders, it is possible to determine just where the rough handling occurs. The records secured from these recorders are sent to the assistant to the general manager. Where rough handling is indicated the division or terminal superintendent is called upon to investigate and handle with the crew involved.

The subject of rough handling of cars is kept before the employees by periodical meetings presided over by superintendents. Here individual cases are called to the attention of employees and information as to what is transpiring on other divisions is given them.

A comprehensive series of reports is maintained, showing the results of these campaigns. These reports are compiled monthly in the general manager's office and copies are mailed to all officers having to do with

rough handling. Recapitulations are made monthly on a comparative basis. Table 2 shows the comparative statement by divisions for 1927.

Table 2.—Cars Damaged by Rough Handling 1927-1926

Division or Terminal	Number Cars Damaged			Amount of Damage		
	1927	1926	1925	1927	1926	1925
Springfield	7	11	21	\$865.00	\$1,205.00	\$1,886.00
Birmingham	31	45	70	1,702.50	3,470.00	2,043.00
St. Louis	68	79	87	1,184.00	3,265.00	4,768.00
Tulsa	105	143	263	8,019.50	2,638.00	8,408.50
Kansas City	130	213	192	4,497.00	4,908.90	7,457.00
Memphis	119	270	217	3,647.50	10,710.35	9,363.44
Total	460	761	850	\$19,915.50	\$26,197.25	\$33,925.94
Western	2	22	26	10.00	2,097.50	796.00
Eastern	20	35	24	1,057.48	925.28	1,350.00
Southwestern	32	158	184	1,703.00	4,828.50	5,019.01
Central	17	13	13	1,472.00	702.00	1,167.64
Southern	53	65	85	2,987.75	3,126.50	7,349.10
Northern	162	153	89	6,624.65	2,730.80	3,684.50
River	71	71	116	2,276.00	2,343.50	5,113.50
Total	357	517	537	\$16,130.88	\$16,754.08	\$24,479.75
Texas Lines	33	30	25	570.50	604.65	591.50
Total System	850	1,308	1,412	\$36,616.88	\$43,555.98	\$58,997.19

The general improvement since 1923 has been described previously. The specific factors of improvement for the one-year period are interesting. The average number of cars roughly handled decreased from 6.39 per division per month in 1925, to 6.15 in 1926, and 4.26 in 1927, or an improvement of 33 per cent; while the percentage of cars damaged to total cars handled decreased from 0.0102 per cent in 1925 to 0.0072 per cent in 1927. The record at the six large terminals is even more impressive. The average number of cars roughly handled decreased from 11.80 in 1925, to 10.57 in 1926, and 6.39 in 1927, or an improvement of 45 per cent; while the percentage of cars damaged to total cars handled decreased from 0.0163 per cent in 1925, to 0.0096 per cent in 1927.

Traveling Engineers Meet at Chicago

Predict ultimate discarding of train orders—Discuss ways of saving more fuel—Urge better training

THE Traveling Engineers' Association held its twenty-sixth annual convention at the Hotel Sherman, Chicago, September 25 to 28, under the leadership of the president, J. D. Heyburn, master mechanic, St. Louis-San Francisco, approximately 400 men who get the power behind American transportation over the roads, gathered from all parts of the continent to exchange their experiences and to report for their own information and that of the managements, what they see ahead in the way of problems requiring solution in the interests of more economical and efficient locomotive operation.

Accomplishments and possibilities in fuel conservation, better methods of handling locomotives in long engine runs, automatic train control, and train handling were embraced in the business of the four-day session. The convention was addressed by the Hon. Frank McManamy, Interstate Commerce Commissioner, and by A. G. Pack, chief locomotive inspector of the commission, and the meeting was given an international touch by the presence of delegates from Mexico and Australia in the persons of Manuel J. Macias, assistant general superintendent, National Railways of Mexico, accompanied by B. Gomez, traveling engineer, and of A. B. Maurice, traveling engineer. Coincident with the meeting, the Railway Supply Association conducted an extensive exhibit of locomotive appliances.

The convention was opened with an address by the president who reminded the members that the traveling engineer is to good locomotive service what the locomotive is to transportation and sounded the keynote of the convention with his statement that: "With the application of many new locomotive devices the traveling engineer must learn how each functions, and to teach the engine crews the correct method of their operation. Today, with the competition of the motor car, motor trucks, buses, automobiles and airplanes, the advance in the cost of railway materials and the constant cry for reduced transportation rates calls for drastic economy by the railroads and traveling engineers must do their utmost to bring about these economies by improvements in locomotive service. The traveling engineers are responsible for much of the improvement in locomotive operation that has already been made and because of this training and knowledge he can be counted upon for further accomplishments."

At the conclusion of his remarks the president expressed regret at the recent death of the association's second vice-president, A. N. Boyd, traveling engineer, Canadian National.

Fuel Conservation

The remainder of the first day was devoted to the presentation and discussion of a report on "Further Possible Means of Fuel Conservation" in connection

with which the traveling engineers welcomed remote switch control and similar devices tending to supplant the train order. They also urged the further development of fuel-saving devices and particularly emphasized the necessity of giving more attention to improvements in the art of locomotive operation by educational work among engine crews.

J. B. Stuart, air brake supervisor, Missouri Pacific, discussed the effect of eliminating train orders and train stops upon fuel conservation. He described an installation of remote switch control on the Missouri Pacific where trains now enter switches at 35 m.p.h. by signals instead of train orders, which means a great saving in fuel and overtime by dispensing with the train stop. The time is coming, declared Mr. Stuart, when the 19 and 31 train orders are going to be a curiosity in transportation. E. P. Ragsdale, Southern Pacific, estimated that remote switch control on the Southern Pacific, by allowing trains to meet and pass each other without stopping, reduces the consumption of fuel oil from 50 to 75 gal. per locomotive for each meet.

It was Mr. Ragsdale's opinion that further fuel savings in oil-burning equipment are dependent upon further improvements in the equipment itself. He said: "We must get away from the necessity of using brick in oil-burning fireboxes. It takes from 12 to 25 min. to get the brick heated properly for efficient oil burning whenever it has been cooled down by stopping at sidings or elsewhere." Expressing the opinion that we are just in the experimental stage of developing and perfecting oil-burning apparatus, Mr. Ragsdale advocated more experimentation with atomization of the oil to stop waste of fuel, and predicted the time when draft regulation will be provided for oil-burning equipment that will restrict the air openings to the region of the burner itself, when the locomotive is not in motion. The New York Central, according to John Brennan, operates 27 oil burners on its Adirondack division from 8 a. m. to 8 p. m. during the season from April 15 to November 1 each year in order to comply with the forest fire regulations. It successfully operates on these engines with a brick arch like that used in coal-burning power without experiencing any leaking of crown bolts.

Roy Hunt, Atchison, Topeka & Santa Fe, cautioned against accepting too readily the statistical reports of fuel-savings or other reductions found in the committee's report or elsewhere in connection with fuel-saving devices because of the lack of authenticity in such figures, and added his opinion to that of Mr. Ragsdale that the method of burning oil in locomotives must receive more attention and that in view of a probable necessity of railroads using lower grade fuel oil in the future, the development of atomization is increasingly important.

The statements in the committee's report purporting to discourage the practice of road foremen of demonstrating to employees their ability to operate locomotives was vigorously opposed, and it was the opinion that the road foreman should always be prepared to follow up his instructions by example. In this connection J. Cronin, Illinois Central, described his long continued practice of holding classes every Friday at 9 a. m. at the enginehouse for enginemen, and every Friday at 3 p. m. for trainmen to familiarize them with the handling of equipment. No charts or text matter are used and any subject may be discussed, but in all instances the en-

ginemen and trainmen are given the chance to inquire about their problems without being ridiculed and have the assurance that a solution of the problem will be furnished, if possible, by demonstration. Interest of this kind by the traveling engineer in the education and training of engine crews, in the opinion of Mr. Cronin, is as important to economical and efficient locomotive operation as the mechanical improvements that have been made.

On the second day of the convention were presented a paper by F. P. Roesch on the subject of "The Effect of Design of Front Ends, Grates and Ash Pans on Locomotive Operation," and a committee report on "Automatic Train Control Installation and Maintenance." In discussing the former report D. I. Bergin (Wabash) pointed out that the average road accepts locomotives from the builders without question as to their suitability for service on that particular road. He pointed out that at best the builder can only turn out a locomotive designed to deliver maximum cylinder horsepower based on the consumption of 120 lb. of 14,000 B.t.u. fuel per sq. ft. of grate area per hour. Any radical decrease in thermal value because of the use of a lower grade fuel may increase considerably the fuel consumption and the only way in which the individual road may know that its locomotives are delivering the output for which they were designed is through the medium of accurate road tests under actual service conditions, using a dynamometer car.

Other speakers, in discussing the brick arch, indicated a favorable opinion of the sealed arch which has no opening next to the flue sheet. The formation of clinkers in the fire, said one member, was due to poor firing on the part of the fireman. There was considerable discussion on the question of air openings in ash pans. While an average of 14 per cent is generally recognized as sufficient to maintain atmospheric pressure under the grates, the experience of several roads with different grades of fuel indicates a varying percentage and it was conceded during the discussion that the eventual solution of the problem may be the application of dampers to control the admission of air under the grates. This would also tend to promote a saving of fuel during stand-by periods.

During the discussion of the paper on automatic train control one member made the statement that, in his opinion, the factor of added safety provided by the application of train control has not proved equal to that obtainable by the expenditure of the same amount of money in other ways. Another member outlined the details of an installation of continuous train control in a territory where wayside signals had never been installed, and from the experience in operating trains over this territory, expressed a favorable opinion of the use of cab signal indications rather than the use of wayside signals. On being questioned as to the method of train operation in the case of a failure of the automatic control he mentioned that the type of equipment in use consisted of color light indications in the cab as well as audible signals together with the actuating equipment on the air brake valve. He said that it was a rare instance when both the lights and the audible signal features failed at the same time but that should such a condition occur the train proceeds under restricted speed to the nearest communication station and operates thereafter under train orders.

An account of the further proceedings will appear in next week's issue.

Looking Backward

Fifty Years Ago

Contracts have been let for grading the New Mexico & Southern Pacific extension of the Atchison, Topeka & Santa Fe from Willow Springs (now Raton) N. M., to Las Vegas, 110 miles.—*Railway Age*, September 26, 1878.

The idea has been suggested that a small machine be attached to the locomotive, and run by steam from the boiler, which will generate enough electricity to light every passenger car to the brilliancy of day. The plan should please the trainmen as there would only be the easy and simple connection of a wire or two when the car was coupled on.—*Railway Age*, September 26, 1878.

A practical application of the telephone is proposed by the Illinois Central—the connection of its local freight agent's office in Chicago with a switch house at the outer end of a yard a half a mile or more away, so that the switchmen can communicate in regard to the arrival of freight trains and receive orders as to the track upon which to send each car without dispatching a messenger.—*Railway Age*, September 26, 1878.

Twenty-Five Years Ago

Tracklaying has been completed on the Eastern Oklahoma (now part of the Atchison, Topeka & Santa Fe) between Newkirk, Okla., and Pauls Valley, I. T., 163 miles.—*Railway Age*, October 2, 1903.

The Tabor & Northern, in southwestern Iowa, has in experimental use a gasoline motor car for passenger service. The conditions are similar to those in many other places where the volume of passenger business is not sufficient to warrant operation of frequent steam trains or the construction of an electric railway. The car seats 20 passengers.—*Railway Age*, October 2, 1903.

The subject of the operation of trains without train orders on double track will be discussed at the next meeting of the Train Rules committee of the American Railway Association late in October. The plan has been followed on the Chicago, Burlington & Quincy between Chicago and Maxon, Illinois, 306 miles, and consists in allowing trains to proceed, under a block signal showing clear without regard to any train of superior class that may be following. This vests the control of the train with the dispatcher and the conductor and has resulted in a large saving in the time of getting trains over the road and a simplification of train dispatching.—*Railway Age*, October 2, 1903.

Ten Years Ago

Recent estimates indicate that the wage increase orders issued by Director General McAdoo since May 25 aggregate about \$650,000,000 as an addition to an annual payroll which for the class I railroads amounted to \$1,750,000,000 in 1917. The average increase received by each employee is about 30 percent.—*Railway Age*, September 27, 1918.

An estimated annual saving of approximately \$36,000,000 by the consolidation and co-ordination of facilities and by other economies in the Eastern region is shown in a report by the regional director to the director general of railroads. Among the items of saving mentioned are operating arrangements which have resulted in economies and improved service aggregating \$18,335,000, reductions in passenger operation, \$8,668,000, and reductions in miscellaneous facilities and forces, \$4,150,000.—*Railway Age*, September 27, 1918.

Hale Holden, director of the Central Western region, in speaking before the thirty-sixth annual convention of the Roadmasters and Maintenance of Way Association at Chicago last week, called attention to the necessity of maintaining the railway machine in the best possible condition for winning the war by keeping skilled railroad men in this country. While he admired the spirit of the men in waiving exemption from service, he believed it was of extreme importance that such exemptions be obtained for the good of the railroads.—*Railway Age*, September 27, 1918.

New Books

American Railway Association, Signal Section; Proceedings, 1927 (Volume XXV): H. S. Balliet, secretary. Cloth, 947 pages, 6 in. x 9 1/4 in. American Railway Association, 30 Vesey street, New York. Price \$8.

This ponderous volume contains the doings of the meeting of the Section at Montreal, in September 1927, and at Chicago in March, 1928, (though the title page calls the volume the "Proceedings of 1927".) Among the numerous reports presented at these meetings and here printed (with the discussions on them very fully reported) are: Automatic train control, with the action of the Interstate Commerce Commission on a large number of installations; cab signals, with discussion by Mr. Rudd; spring switches; centralized dispatcher-control of trains as exemplified on the New York Central between Toledo, Ohio and Berwick; and highway crossing signals, the latter including data concerning conditions and regulations in different states.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Statistics of Railways of Class I—United States (1917-1927). Investment and income, fixed charges and dividends, employees, their compensation, traffic statistics and averages, equipment in service, distribution of railway operating revenues, taxes by states, and other statistics for the years covered, issued as Statistical Summary no. 8. 11 p. Pub. by Bureau of Railway Economics, Washington, D. C. Apply.

Analysis of Railroad Securities—A Guide to the Determination of Investment Values, by Jules I. Bogen. Dr. Bogen is assistant Professor of Finance in New York University and Financial Editor of the New York Journal of Commerce. This work is in three parts, I. The New Order in the Railroad Industry [from the Transportation Act, 1920], II. Evaluation of an Individual Railroad, and III. Financial Analysis. 449 p. Pub. by Ronald Press, New York City. \$6.00.

The Economics of Rail Transport in Great Britain, by C. E. R. Sherrington Vol. I. History and Development. Vol. II. Rates and Service, which are obtainable separately. Practical, emphasizing the dynamic quality of transport services, and written in a vigorous style, this work is a most important contribution to railway economics. Vol. II includes comment on American problems and conditions. 2 vols. Pub. by Edwin Arnold, London, Eng., 12 shillings the set, 12 shillings sixpence each. Vol II also published by Longmans, Green & Co., New York City.

Periodical Articles

Flying Freight, by Robert E. M. Cowie. An account of the earliest attempts at air express in this country with suggestions as to possible development of commercial air services. *Magazine of Business*, September 1928, p. 241-244, 276-278.

Railroads, Politics and Prosperity, by Samuel O. Dunn. Problems facing the railroads at the present time and how and why they should interest thinking men and women. *Scribner's*, October 1928, p. 406-414.

The Present Position as Regards the Question of Dynamic Influences on Railway Bridges, by A. Ronsse and R. Desprets. American and European points of view and what research is necessary. *Bulletin of the International Railway Congress Association*, September 1928, p. 717-723.

William Henry Brown, by Alice Van Leer Carrick. A sketch of the life of the man who wrote "History of the First Locomotives in America" and cut the famous silhouette of the DeWitt Clinton Train on which he was a passenger on the first run. Illustrated with this and other silhouettes cut by Brown. *House Beautiful*, October 1928, p. 396-397, 438, 440-442.

Odds and Ends of Railroading

The New York News announces the engagement of Miss Virginia Karr to Sabin Carr, world's champion pole vaulter. The same journal, in commenting upon the fact, wishes to know if, instead of a minister, they will call in a railroad switchman to couple the Karrs.

President Ross Honored

During the course of his railway career, W. L. Ross, president of the New York, Chicago & St. Louis, has been the recipient of many honors, but it is doubtful if any of them have been appreciated more than that conferred on him on September 11. On that date Mr. Ross, a former pounder of the key, was elected president of the Old-Time Telegraphers Association, at the annual meeting of that body in Omaha.

Leaps from Train to Rescue Child

An heroic rescue of a two-year-old child was performed on August 21, when F. T. Calhoun, a Pennsylvania flagman, leaped from the caboose of a freight train, moving at the rate of 25 miles an hour, near Marietta, Pa., and snatched the baby from the path of a train coming in the opposite direction. The child was seated on the track a short distance beyond a curve and thus could not have been seen by the engineman of the train, which was due to pass a few minutes before the rescue but which had been slightly delayed by trackmen.

Service

The spirit of co-operation shown by Southern Pacific through Agent T. W. Roach at Redlands, Cal., in having the Sunset Limited stopped at that station to receive an emergency express package, has been commended by Dr. Wm. E. Phelps, city veterinarian of Redlands. Several children of that city had been bitten by a dog, suspected of having rabies. The doctor desired the head of the dog rushed to Berkeley for examination as quickly as possible and appealed to Agent Roach who had the Sunset stopped. Examination showed that the dog was infected and the children were ordered to have the Pasteur treatment. The several hours gained by stopping the fast train may have saved the lives of the children who were bitten.

Self-Importance

The following is taken from the current issue of the proceedings of the Safety Section, American Railway Association, page 198:

"There is a fellow who works for me on the outbound tracks in Canton, a colored fellow named Parker Johnson. The other day was pay day and I gave the men their checks. There were two or three of them. Two of them rolled up their checks and put them in their pockets. Parker Johnson looked at his check and he said, 'Hm, I see the treasurer of the Pennsylvania has his name on this check.' Then he looked a little closer and said, 'General Atterbury's name is on the check, too.' Then he turned it over and looked at the back and said, 'But it ain't no good until Parker Johnson puts his name on it.'"

Rats!

Tom, an ordinary brindled cat, is perhaps the only feline in the world in the employ of a railroad company. He regularly is entered on the books of the Kansas City Southern at Texarkana, Ark., to draw a compensation of \$1.50 a month, which is used to buy his food. Damage to freight caused by rats was heavy last fall, and Tom was "hired" when his ability as an exterminator of rodents was proved in competition with a number of his kind. The Kansas City Southern had been spending \$10 to \$15 a month for poison, so Tom's salary check

was approved. Tom observes regular hours and never worries concerning overtime.

So It Has Come to This

The bards of England long have sung the story of King Canute. Experts in apple sauce at the king's court assured him he was so great a man he could make the sea stand still, just by a word of command. But when he tried it the sea swept in and ducked him so badly the royal guards had to roll him on a barrel. Then he had his flatterers hanged. I. D. Kessler of Goshen, N. Y., probably never heard of King Canute but he seems to have absorbed his early ideas. Starting off recently on a holiday ride in his automobile, accompanied by three friends, he attempted to drive the machine over a grade crossing of the Lehigh & New England. But a train got there first. A moment later the automobile was wrecked, and Kessler and his friends were dotted over the surrounding landscape, rubbing bumps and bruises. With a tire still draped around his neck, the angry Kessler arose and limped painfully over to the engineer, who had run back from the halted train. "I waved my hand to you, plainly showing I intended to cross over first," he shouted, "I'll have the law on you for this." And the engineer fainted.

Airplane Aids Bridge Designing

The airplane, used as an aid in bridge engineering, facilitates the securing of valuable data, according to C. R. Harding, engineer of standards for Southern Pacific, who recently completed what is believed to be the first aerial inspection of a bridge site. Seated in the cabin of a tri-motored Fokker plane, Mr. Harding and a number of his associates flew to and fro over the waters of Suisun Bay at elevations ranging from a few hundred feet to more than five thousand feet. The purpose of the flight was to complete data required for construction of the company's proposed railroad bridge over the bay. "From the plane," Mr. Harding said, "it was possible to get a more comprehensive view of the site than otherwise would be possible. Bars and obstructions under water could be seen with ease, and the results of this inspection are of undoubted value. The data gathered convince us that there is no possibility that the proposed bridge will in any sense be an obstruction to navigation. The lift span will be over the navigation channel and will also provide a clearance of 135 feet above high water."

—And When in Bad Humor the Boss

Should Burn a Fusee on His Desk

Many of the vicissitudes and tribulations of this "vale of tears" are caused by the boss not wearing a red shirt. A stranger enters and inquires where he will find Mr. E. O. Woofus (said Woofus being the boss). You cast your blinkers towards the front office. There in all his pristine glory sits the boss. Now obviously you can not say, "yes, yes, that's him—the guy in the white shirt," for as it happens all the rest are also draped in shirts of snow-white. Neither can you say, "the chappy with gargantuan beak," "the loving cup ears," or "the chin moss," as the case may be. So you content yourself with pointing indefinitely, and mumbling something about "first desk to the right of the left center, etc." The stranger's first shot is way short of the green, and lands in the rough, as represented by Mr. Snuzzle, the office grouch. All this could be avoided, if the boss wore a red shirt. The ensuing dialogue would then take place in this Utopia of offices:

"Where will I find Mr. Woofus?"

"That's him, the gentleman in the red shirt."

"There is another reason for the red shirt. No verbose explanations are necessary. All fellow-workers will understand us. You can see him a long way off.—Louisville & Nashville Magazine.

NEWS of the WEEK



Maine Central, No. 29, Leaving Portland, Me.

FIRE CAUSED BY LIGHTNING destroyed the roundhouse of the Missouri Pacific at Lincoln, Neb., on September 12; estimated loss \$25,000. Three locomotives and a rail motor car were damaged.

THE NEW ENGLAND RAILROAD CLUB will hold its next meeting at the Copley Plaza Hotel, Boston, on the evening of October 9, with a paper by W. K. Hallett, general manager of the Bangor & Aroostook, on "Transportation and Potatoes."

THE WESTERN RAILWAY CLUB will hold its next meeting on Monday evening, October 15. J. A. Peabody, signal engineer, of the Chicago & North Western will read a paper on automatic train control.

THE CANADIAN RAILWAY CLUB will hold its next meeting on Tuesday evening, October 9, which evening will be called "Baldwin night". Mr. W. A. Austin will present a paper, illustrated by motion pictures.

THE CAR FOREMEN'S ASSOCIATION OF CHICAGO will hold its next meeting at Morrison Hotel, Chicago, on Monday evening, October 8. This will be the annual meeting and officers will be elected. An entertainment will be provided followed by a dance.

AS HIS 75TH BIRTHDAY occurred on Wednesday, September 19, the Honorable Frank Oliver, a member of the Dominion Railway Board, ceased his official duties on the Board on the previous evening, the Civil Service Act compelling retirement at 75.

THE CAR FOREMEN'S ASSOCIATION OF ST. LOUIS will hold its next meeting at the Broadview Hotel, East St. Louis, Ill., on Tuesday evening, October 9, with a paper by W. H. Davies, superintendent of air brakes, of the Wabash, on Standardization of Freight Car Brakes.

THE MISSOURI PACIFIC is conducting a contest to determine the best form of advertising for the modern railroad. Prizes totaling \$1,000 will be given for the best advertising layouts submitted. Only newspaper men, and advertising

agency employees are eligible. The contest will close at midnight on December 31.

THE SOUTHERN PACIFIC is offering a reward of \$2,500 for information leading directly to the arrest and conviction of the bandit who held up passengers on its train, the Lark, which left Los Angeles, Cal. on September 13 for San Francisco. The masked bandit boarded the club car and with two automatics took over \$800 from the 23 passengers in the car. He made a quiet exit from the car as it approached Glendale, and vanished into the darkness as the train came to a stop.

Employees Buy 17½ Millions of Stock

The Pennsylvania Railroad announces that employees of the Pennsylvania and its associated companies to the number of 101,000 or more, have taken advantage of the opportunity recently given to them to buy shares of stock of the company at par. The number of shares allotted was 350,000 (\$50 a share) and the offering was over-subscribed.

Hudson Bay Branch Completed

The last spike has been driven on the Flin Flon branch of the Hudson Bay Railway, marking the completion of that line from Shewan, Man., into the Flin Flon mining area along the Saskatchewan-Manitoba border. It was driven by John Bracken, premier of Manitoba, on September 22 at a point 84 miles from the start of the extension. James Malcolm, Canadian minister of trade and commerce; Major Graham A. Bell, deputy minister of trade and commerce; and Dr. Macintosh Bell, geologist, also took part in the celebration and ceremonies incident to the driving of the last spike.

Mutual Beneficial Association P. R. R.

Ninety-five delegates were present at the fifteenth annual general assembly of the Mutual Beneficial Association of Pennsylvania Railroad employees which was held at the Bellevue-Stratford, Philadelphia, on September 24, 25 and

26, with M. F. Loughner, general president of the Association, acting as chairman. Addresses of welcome were given by President W. W. Atterbury and other officers of the road.

This association now has 79 local assemblies and its assets amount to over \$1,000,000. Its fraternal insurance plan represents \$10,000,000.

Harahan Bridge Out of Service

The Harahan bridge of the Arkansas & Memphis Railway Bridge & Terminal Company over the Mississippi river at Memphis, Tenn., providing a crossing for the Chicago, Rock Island & Pacific, the Missouri Pacific and the St. Louis Southwestern, was badly damaged on September 17 by a fire which started near the Tennessee side on one of the vehicular roadways. It is expected that the bridge will be closed to both railroad and vehicular traffic for from six weeks to three months. Missouri Pacific, Rock Island and Cotton Belt trains will use the St. Louis-San Francisco bridge while repairs are being made to the Harahan bridge; and the Frisco has established a flat-car service over its bridge for motor vehicles.

Lackawanna to Use 3,000-Volt Direct Current for Suburban Electrification

The Delaware, Lackawanna & Western has announced its decision to use 3000-volt direct current power for the operation of multiple-unit trains on the 173 miles of track to be electrified in the northern New Jersey suburban zone served by that road. This form of power supply was adopted to meet the immediate requirements of suburban service and possible future requirements of main line service in the event that it is later considered desirable to carry the electrification of the Lackawanna over the Pocono mountains to Scranton, Pa., and the anthracite coal fields. The distance from the Hoboken, N. J., terminal, which is to be electrified, to Scranton, is 134 miles.

Mercury arc rectifiers will be used for converting alternating current from the

transmission lines to direct current for use on the trolley and the announcement states that this will be the most extensive application of mercury arc rectifiers in this country.

Discipline on a State Railroad

The Boston Elevated Railroad is at present operated by a Board of Trustees, acting for the State of Massachusetts, and the governor of the state, it will be recalled, recently made public some severe criticisms of the discipline on the line in connection with a fatal derailment on a sharp curve in August.

The trustees have now filed with the governor a report of their action in connection with the case of the motorman who was at fault in the derailment. They say that applications for appointment as motorman on the elevated lines (not the surface street cars) are to be submitted by the general manager of the Board of Trustees, with suitable records and recommendations. These motormen must have a physical examination at least once a year (four motormen have been dismissed).

An agreement has been made with the union of employees (a division of the Amalgamated Association of Street & Electric Railway Employees) under which discharge or suspension by the general manager may be appealed to the Board of Trustees but not, as heretofore, to a Board of Arbitration. The decision of a majority of the board shall be conclusive.

Certificates Sought For Barge Lines Under New Law

The Inland Waterways Corporation has filed application with the Interstate Commerce Commission under the Barge Line Act for certificates of public convenience and necessity for the government's barge transportation lines on the Mississippi River from the Twin Cities to New Orleans and on the Warrior River from New Orleans to Birmingham, Ala. The history of the barge line operations is presented in support of the application for certificates under the new law passed by the last Congress.

The corporation's application further requests that upon issuance of such certificates the Commission order the railroads to join in the establishment of through routes and joint rates with minimum differentials and that the rail carriers also be directed to enter negotiations for equitable divisions of such joint rates within 30 days after their establishment. The Inland Waterways Corporation represents in its application that the through routes and joint rates already established are inadequate to serve fully the public interest or to permit development of the barge transportation system.

Great Northern's New Line Ready

On October 7, the Great Northern will begin operating the new Chumstick line, on the east approach to the Cascade range. This line, which is 17½ miles long, was built to reduce grades and im-

prove the alinement between Peshastin, Wash., 19 miles west of Wenatchee, and Winton, and comprises a supplement to the project for a new crossing of the range through the new Cascade tunnel, 8 miles long, on which it is expected to complete work about the first of the year.

The new Chumstick line involved an expenditure of \$5,500,000 and, in addition to heavy grading, involved the driving of three tunnels, of which the longest has a length of one mile; and the construction of a bridge over the Wenatchee river, 360 ft. long. The new line has a maximum grade of 1.6 per cent and no curves in excess of 3 deg., whereas the old line had maximum grades of 2.2 per cent and 55 curves, many of them of 9 deg., with a total central angle nearly equal to four complete circles. There are snow sheds having an aggregate length of 1½ miles on the old line, but sheds will be unnecessary on the new line.

Reading Wheat-Smut Control Train

Substantial savings are expected to accrue to Pennsylvania wheat growers as a result of the 29-day tour of the wheat smut control train, operated by the Reading in cooperation with Pennsylvania State College. The seed cleaning and treating machines are installed in a baggage car which is making a one day stop at each of 29 stations, convenient to wheat growing areas along the Reading lines.

At the close of its visit to the twenty-fourth town on this route, the train had cleaned and treated more than 25,000 bushels of wheat and had been inspected by 20,000 visitors. Notice is sent ahead to farmers and those desiring to have their wheat treated are given tickets so that they need lose no time waiting, but each appears at the train at the time indicated as his turn.

The smut which has damaged wheat in Pennsylvania has been increasing its destruction for seven years past and is now considered the most destructive disease attacking wheat. The spread of smut has been promoted by the fact that farmers now plant their wheat 10 to 20 days later than formerly in order to avoid attacks of the Hessian fly.

In treating, the seed is passed through a drum in which each kernel is coated with copper carbonate dust. The train is equipped with the most modern machinery for this processing. It is expected that more than 30,000 bushels will be treated during the tour of the train. The treating work is carried on under the supervision of Dr. R. S. Kerby, extension plant pathologist, Pennsylvania State College. The smut control car is operated by a crew of five men.

Included in the train is a business car which provides sleeping and eating quarters for the crew. As far as possible all train movements are made on regular schedules.

New York Meeting, National Safety Council

The National Safety Council, Homer E. Niesz, president, will hold its seventeenth annual safety congress in New York City on October 1, 2, 3, 4 and 5. Meetings are to be held in five different hotels, but those of the steam railroad section are all to be held at the Waldorf-Astoria, 33rd street and Fifth avenue, the morning sessions beginning at nine and the single afternoon session (Wednesday) at 2 o'clock. The chairman of the steam railroad section is E. R. Cott, (Hocking Valley) Columbus, Ohio; secretary, C. F. Larson, (Missouri Pacific) St. Louis, Mo.

Following are the salient features of the program, the name of the chairman or speaker being given, following each subject:

Tuesday morning, Highway crossing accidents, C. T. Bailey; Accident causes and remedies, T. H. Carrow; Safety contests, L. G. Bentley.

Wednesday morning, Address by Girard C. Varnum, secretary, St. Louis Safety Council; Preservation of health, Arthur Geiringer, M. D., Equitable Life Assurance Society; Motor cars, S. H. Osborne, (U. P.).

The election of officers comes at the end of the Wednesday morning session, and this is followed by a luncheon, at 12:30, in the grand ballroom, J. E. Long (D. & H.) toastmaster.

Wednesday afternoon, The Whistle and the highway crossing, J. A. Carney (C. B. & Q.); Men on the leading foot-board of switchers, J. E. Long; Marine



Reading Smut Control Car in Operation

accidents, A. B. Hoff (Erie); Falls, Z. B. Claypool, (St. L.-S. F.).

Thursday morning, Safety in M. W. Department, W. L. Roller, (H. V.); Safety in the yard, J. H. Spooner (New York Central); Safety on the road, J. L. Walsh, (M.-K.-T.).

Farmers Aid South Dakota Railroad Project

The Mound City & Eastern, which was granted permission by the Interstate Commerce Commission late in May of this year to construct a 70-mile railroad between Mound City, S. D., and Leola, had its inception as a transportation project among farmers in Campbell and McPherson counties in South Dakota, and was made possible by their financial aid. In the spring of 1927 two committees of six farmers each began raising funds and \$160,000 has been turned over to a joint committee which will hold the money until half of the roadbed has been completed and accepted. At that time the money will be transferred to the railroad company, along with an additional \$40,000 of farmers' pledges, in exchange for preferred stock. The total cost of the proposed road is estimated at \$1,600,000.

The company was originally financed by the late Julius Rosholt, banker of Minneapolis, Minn., who built the Mississippi, Hill City & Western (now the Hill City) in 1908 and the Fairmont & Veblen (now part of the Minneapolis, St. Paul & Sault St. Marie) in 1912. Connection will be made with the Minneapolis & St. Louis at the eastern terminus of the railroad at Leola and with the Chicago, Milwaukee, St. Paul & Pacific at Eureka, S. D. The topography of the country will make possible the construction of a line with a maximum grade of 1.1 per cent.

Operation of the Mound City & Eastern will aid farmers who have heretofore been forced to haul their crops and other products as much as 50 miles by highway to the nearest railroad. While wheat will constitute the principal tonnage of the road in the two countries, dairying, livestock and poultry raising are important traffic sources. In 1927, farmers in the territory to be served shipped grain valued at \$7,514,271. Other shipments were valued as follows: Livestock, \$3,487,610; dairy products, \$582,986; eggs, \$181,164; poultry \$135,976; wool, \$16,577.

Present officers of the railroad are: W. W. Robey, president, Eureka, S. D.; T. J. P. Geidt, vice-president, Eureka; L. Ruth Rosholt, secretary, Minneapolis; W. S. Given, treasurer, Britton, S. D.

Pennsylvania Sports in Altoona

The Central Region carried off the honors at the eighth annual outdoor track and field meet of Pennsylvania employees which was held at Altoona, Pa., on Saturday, September 22. The men and women athletes of that Region scored a total of 254 5/6 points to win the System championship, thus defeating for the first time in the history of the road's athletics the contestants representing the Eastern Region.

The Eastern Region athletes finished in second place, with a total of 191 1/3 points. Third place went to the Western Region, with the score of 116 1/3 points. The General offices at Philadelphia scored 95 1/2 points for fourth place, and the Altoona Works was last with 49 points.

The weather was ideal, and the 900 men and women contestants found conditions favorable to record-breaking performances. As a result, new System records were established in the following events:

440 yard run, novice—won by McKnight of the Eastern Region. Time, 55 2/5 seconds.

Hop, step and jump, senior—won by Charles W. Anson, Central Region. Distance 44 feet, 1/2 inch.

Broad jump, senior—won by Charles W. Anson, Central Region. Distance 23 feet, 5 inches.

100 yard swim, senior—won by J. Law, Central Region. Time 58 3/5 seconds.

220 yard swim, senior—won by J. Law, of the Central Region. Time, 2 minutes, 23 3/5 seconds.

Senior plunge—won by J. Hauck, of the Western Region. Distance, 70 feet, 2 inches.

Junior plunge—won by R. Kohlmeyer, of the Western Region. Distance, 64 feet, 2 inches.

Shot put—won by D. F. Christy, of the Central Region. Distance, 50 feet, 3 inches.

A crowd of more than 20,000 persons, composed chiefly of Pennsylvania officers and employees, and guests from other railroads, witnessed the track and field events on Cricket Field, the company's own athletic grounds at Altoona. Trap shooting, tennis, golf, rifle shooting, quoits, horseshoes and swimming were held at other points in or near the city. Contestants and spectators from all parts of the System were carried to Altoona for the meet on special trains.

The day's program was closed with the first of a series of three games to determine the System baseball championship of the Pennsylvania Railroad. The Pitcairn Shop team (Pittsburgh Division) champions of the western part of the System, defeated the Philadelphia Terminal Division, champions of the eastern part of the System by a score of 10-4. The game was called at the end of the seventh inning on account of darkness. The second game of the series is scheduled for Philadelphia this week, and if a third game is necessary it will be played on the home grounds of the Pitcairn team.

General Foremen's Exhibition

An interesting exhibition of machinery and equipment was shown in connection with the twenty-third annual convention of the International Railway General Foremen's Association, held at the Hotel Sherman, Chicago, September 18, to 21 inclusive.

The exhibition was held under the auspices of the Association of Railway Supply Men, which elected the following officers for the ensuing year: President, C. F. Weil, American Brake Shoe &

Foundry Company, Chicago, and secretary-treasurer, E. H. Weaver, Westinghouse Air Brake Company, Chicago. One new member was elected to the executive committee which now consists of C. M. Hoffman, Dearborn Chemical Company, Chicago; J. Will Johnson, Pyle-National Company, Chicago; R. T. Peabody, Air Reduction Sales Company, New York; and F. Ehredt, Nathan Manufacturing Company, Chicago.

The list of companies, products on exhibition and representatives in attendance are shown below.

Air Reduction Sales Company, New York—Oxyacetylene welding and cutting equipment. Represented by J. W. Kenefic, T. M. Hamer, R. T. Peabody, E. M. Sexton and B. N. Law. Armstrong-Blum Manufacturing Company, Chicago—Automatic hack saw and metal band saw. Represented by H. J. Blum and S. A. Wolben. American Brake Shoe & Foundry Company, New York—Brake shoes. Represented by H. W. Hurst, J. W. Waters, C. F. Weil and F. P. Biggs. The Ashton Valve Company, Boston, Mass.—Safety valves, steam and air gages, wheel press recording gage and double ram attachment, driving-wheel quartering gage and dead-weight gage tester. Represented by J. F. Gettrust and C. Gaston. Barco Manufacturing Company, Chicago—Metallic steam, air and water connections between engine and tender, reservoir joints, smoke box blower fittings, steam-heat car and rear tender connections, lubricated balanced plug valves and power reverse gears. Represented by C. L. Mellor, C. O. Jenista and F. B. Nugent. The Borden Company, Warren, Ohio—Die stocks, square end pipe cutters and power drive. Represented by H. R. Williams and V. M. Gaspar. Buckeye Portable Tool Company, Dayton, Ohio—Pneumatic grinders and drills, sanders, buffers, frame jaw grinders and pencil grinders. Represented by W. R. Gummere and H. W. Leighton. Chicago Pneumatic Tool Company, New York—Pneumatic tools and accessories. Represented by J. L. Rowe, H. R. Deubel, R. C. Bucholz, L. F. Duffy and F. O. Duffy. Clark Manufacturing Company, Philadelphia, Pa.—Bolt jack, bridge, lift blocks, journal jack, connecting jack, pinion puller and universal press, and parts. Represented by H. J. Smith and H. C. Schroeder. Cleveland Pneumatic Tool Company, Cleveland, Ohio—Air drills, air grinders, valve grinders, riveters, chipping, calking and beating hammers. Pressure-seated air valves, and air hose couplings. Represented by C. J. Albert. The Cleveland Tool Engineering Company, Cleveland, Ohio—Circular relief grinder. Represented by C. W. Mader. Colonial Steel Company, Pittsburgh, Pa.—Tool steel and blue prints, catalogs, etc. Represented by W. E. Thurber. Crucible Steel Company of America, New York—Railroad shop tools made from special high speed steel and carbon tool steel. Represented by W. M. Stevenson, F. Baskerville and J. H. Jones. Davis Boring Tool Company, Inc., St. Louis, Mo.—Car-wheel boring bars, driving box bars, rods and rod brasses, reamers and block type tools; boring bars and reamers for all locomotive and car shops. Represented by R. G. Kilzer, G. G. Porter, R. T. Monahan and R. A. Braunberger. Dearborn Chemical Company, Chicago—Feedwater treatment, treating plants, and rust preventive. Represented by C. M. Hoffman, R. Q. Milnes, C. F. Barham, H. F. Crocker, I. H. Bowen and F. B. Horstmann. Detroit Lubricator Company, Detroit, Mich.—Mechanical lubricator, hydrostatic lubricator, transfer filler and pendulum type automatic flange oiler. Represented by S. A. Witt and W. B. Drake. Paul Dickinson, Inc., Chicago—Caboose jacks, cast iron exhaust heads and ventilators. Represented by A. J. Filkins and A. E. Engman. Durametallic Corporation, Chicago—Flexible metallic packing for locomotives and power houses, and tire reconditioning apparatus. Represented by C. C. Hall and J. M. Bandish. The Edna Brass Manufacturing Company, Cincinnati, Ohio—Mechanical lubricator, coal sprinkler, air mainfolds, automatic oilers, water columns, rigid type water-gage glass, fire extinguisher, oil burner, boiler check for feed water pumps, air-operated cylinder cock and gage cock. Represented by E. O. Corey and F. S. Wilcoxon. Faessler, J., Manufacturing Company, Moberly, Mo.—Rod-bushing rollers. Represented by G. R. Maupin.

Firth-Sterling Steel Company, Chicago—Tool Steel. Represented by E. T. Jackman, A. Jackman and C. E. Hughes.

Flannery Bolt Company, Pittsburgh, Pa.—Flexible staybolts. Represented by J. R. Flannery, E. S. Fitzsimmons and W. M. Wilson.

Forster Paint & Manufacturing Company, Winona, Minn.—Literature. Represented by H. J. Caswell.

Foster-Johnson Reamer Company, Elkhart, Ind.—Hand expansion reamers and slide valve broaching tool. Represented by F. M. Enos, L. G. Groessi and C. B. Whitmyer.

Franklin Railway Supply Company, Inc., New York—No exhibit.

Gilg, Henry F., Pittsburgh, Pa.—Hollow staybolts, drop-forged tire-turning tools. Represented by H. F. Gilg.

Goddard & Goddard Company, Detroit, Mich.—Milling cutters and reamers. Represented by C. S. Goddard and C. H. Wallace.

Gold Car Heating & Lighting Company, New York—Car-heating pressure-reducing valve, steam hose couplers, automatic drain cock for air pumps and vapor valve. Represented by A. D. Stuver.

Goodall Rubber Company, Chicago—Air hose, lip air brake gaskets, metallic squirt hose, metallic car steam-heat hose, boiler washout hose, axle-generator lighting belt and A.R.A. air-brake gaskets. Represented by C. L. Butler.

Graham-White Sander Corporation, Roanoke, Va.—Sanders and sander spreaders. Represented by W. H. White.

Grip Nut Company, Chicago—Grip nuts. Represented by L. W. Kass and J. E. Weatherford.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder bushings, packing and bull-rings, valve bushings, rings, and bull-rings, duplex sectional cylinder packing, cross-head shoes and gibbs, hubliners, floating rod bushings, air pump bushings, packing tubs and piston heads. Represented by V. W. Eller, E. J. Fuller, F. W. Lampton and D. F. Hall.

Hunter Saw & Machine Company, Pittsburgh, Pa.—High speed cut-off saws, rivet sets, chisel blanks, metal-cutting saws, pipe cutters and universal air-hose couplings. Represented by F. A. Hunter, Jr., J. A. Carothers, C. Schnubel and P. W. Wendt.

Hutto Engineering Company, Inc., Detroit, Mich.—Grinders and grinding machines, link motion bores, cylinders and piston valve liners. Represented by G. C. Page and G. M. Alderman.

Independent Pneumatic Tool Company, Chicago—No exhibit. Represented by I. S. Cooper, A. Anderson, A. W. Nugent, I. T. Cruice and O. Dallman.

Locomotive Firebox Company, Chicago—Nicholson thermic syphon. Represented by A. A. Taylor, L. R. Pyle, C. M. Rogers and C. A. Seley.

Lovejoy Tool Works, Chicago—Tube expanders, flue roller expanders, heading tools, flue cutters, flue-hole cutters, belling tools, rivet set recutting tools, use-em-up drill sleeves, Calumet die starters, Lacerda boiler tools and Lovejoy jacks. Represented by W. H. Dangel.

MacLean-Fogg Lock Nut Company, Chicago—Lock nuts. Represented by J. W. Fogg and W. G. Willcoxson.

Manning, Maxwell & Moore, Inc., New York—Micro grinder and Monarch lathe. Represented by F. W. Blake, O. D. Kinsey, W. Deems and W. A. Coty.

Metal & Thermit Corporation, New York—Thermit welds. Represented by C. D. Young, L. G. Vock and A. F. Beaulieu.

Miner, W. H., Inc., Chicago—Safety hand brake and friction draft gears. Represented by B. S. Johnson.

Nathan Manufacturing Company, New York—Mechanical and bullseye lubricators, water column, injector, low water alarm and boiler check. Represented by R. Welsh, T. J. Murphy, J. A. Kelly and F. E. Ehardt.

National Boiler Washing Company of Illinois, Chicago—Moving picture showing operation of boiler washing system. Represented by F. W. Gale.

National Malleable & Steel Castings Company, Cleveland, Ohio—Draft gears, power hand brakes, journal boxes, center plates, wrecking brooks, engine pockets, couplers, yokes, National Hyatt roller bearings, and steam shovel chain. Represented by F. E. Moffett and G. R. Rasmussen.

National Tube Company, Pittsburgh, Pa.—Superheater and locomotive boiler tubes and safe ends. Represented by J. W. Kelly and P. J. Conrath.

Niles Tool Works, Hamilton, Ohio—No exhibit. Represented by W. R. Mullinix, D. S. Woods and B. A. Donahue.

Oakite Products, Inc., New York—Cleaning materials. Represented by V. D. Smith.

Ohio Injector Company, Chicago—Low water alarm, lubricator, automatic rail and flange oiler, injectors, lubricator transfer filler automatic drifting valve, boiler check, water glass protector. Represented by W. H. Malone, N. M. Barker and A. C. Beckwith.

Okadee Company, Chicago—Blow-off valves, automatic cylinder cocks, tender hose couplers

and front-end hinges. Represented by W. H. Heckman, G. P. Dirth, M. H. Oakes, A. G. Hollingshead, J. S. Lemley, C. W. Ploen, J. M. Monroe and C. R. Long, Jr.

Oxweld Railroad Service Company, Chicago—Welding and cutting equipment and sampler of Chrome plating. Represented by G. M. Crownover, W. Jones, F. H. Frye, G. E. Wagner and A. N. Lucas.

Paxton-Mitchell Company, Omaha, Neb.—Metallic packing. Represented by J. J. Keliher and H. J. Molloy.

Pilliod Company, New York—Baker valve gear, and Transportation Devices Corporation cut-off control. Represented by J. C. Cooper, W. H. Bellmaine and F. Fisher.

Pilot Packing Company, Inc., Chicago—Various packings, listing and drifting valve. Represented by J. Sinkler, L. B. Rhodes and R. N. Sinkler.

Pyle-National Company, Chicago—Turbo generators, headlight cases, floodlights, marker and classification lamps, back-up lamps, cab lamps, locomotive electrical fittings, car fixtures and fittings, safety switches, vapor-proof lamps, shop and roundhouse fixtures and fittings and Bakelite products. Represented by J. W. Johnson, W. Miller, J. A. Amos, W. H. East, J. V. Baker, W. A. Ross, R. R. Bush, W. F. Jansen, and R. L. Kilker.

Railway Age and Railway Mechanical Engineer, New York—Copies of publications and books. Represented by H. H. Morrison, H. C. Wilcox, E. L. Woodward and C. Packard.

Reliance Machine & Stamping Works, Inc., New Orleans, La.—High pressure grease appliances for locomotive connecting-rod lubrication. Represented by G. A. Pettit, G. T. Mumford and W. H. Davidson.

Standard Auto-Tite Joints Company, Pittsburgh, Pa.—Two-in. all-metal steam pipe connection with flexible ball joints for railroad passenger cars and 1½-in. air-brake flexible expansion pipe connections between locomotive and tender. Represented by A. M. Fraunheim.

Swanson Company, Chicago—Locomotive gage holders. Represented by O. W. Swanson and R. V. Larson.

Timken Roller Bearing Company, Canton, Ohio—Roller Journal bearings. Represented by R. M. Ross.

Viloco Railway Equipment Company, Chicago—Improved locomotive sanders, vacuum bell ringer, floating journal bearing, uncoupling lever attachment, rail washer and pneumatic whistle operator. Represented by C. R. Long, Jr., A. G. Hollingshead, J. J. Melley, G. P. Dirth, J. S. Lemley, W. H. Heckman, M. H. Oakes, J. M. Monroe and C. W. Ploen.

Westinghouse Air Brake Company, Chicago—Brake-cylinder dust protectors, pneumatic horn for steam locomotives, super-governor for air compressors on superheated steam locomotives, electro-tite hose couplings, nipples and lamps, lap-joint rings for triple valves, and packing cups and gaskets. Represented by E. H. Weaver, J. R. Holton and L. M. Carlton.

Whiting Corporation, Harvey, Ill.—Literature. Represented by H. K. Christie, F. Walsh and H. G. Buckbee.

Whitney Metal Tool Company, Rockford, Ill.—Hand punches and shears, and angle iron machinery. Represented by G. Jensen.

Dotsero Cut-Off Hearing

The hearing before the Public Utilities Commission of Colorado on the application of the Denver & Salt Lake Western for permission to construct a connection from Orestod, a point on the Denver & Salt Lake west of the Moffat tunnel, to Dotsero on the Denver & Rio Grande Western, was opened at Denver, Colo., on September 17. Before the opening of the hearing, which is being held for the Interstate Commerce Commission, W. R. Freeman, president of the Denver & Salt Lake Western, stated, in answer to a questionnaire, that the line could be constructed at a cost of \$2,555,000 and could be completed within 14 months. The distance between Denver and Dotsero would be reduced by 172.5 miles and it was estimated that the cut-off would move 334,000 tons of freight and 135,590 passengers per year, with a gross revenue of \$510,000 and a net railway operating income of \$181,300 for the first year of operation.

The D. & R. G. W., while filing a petition of intervention in the case, qualified it by stating that it would be ad-

vantageous to all concerned if the cut-off were built. The Rio Grande Western asked that the construction be subject to the following conditions:

That it either be allowed to build and operate the cut-off with funds which it now has available, which would avoid issuing stocks or bonds of the applicant or of any other party, or that it would be allowed to acquire not less than a one-half interest in the company owning the cut-off, and be allowed to arrange, on fair and equitable terms, a trackage contract permitting it to operate over the line of the Salt Lake company between Dotsero and Orestod.

The petition stated that if these conditions are not met the Rio Grande Western is prepared to build a short line of its own between a point on its main line and Denver which would be as short, or shorter, than the Dotsero-Denver & Salt Lake line, with the assurance of more dependable service.

Mr. Freeman testified that the Denver & Salt Lake, under the recent reorganization plan, would have ample funds available by the sale of the Series B bonds to construct the extension and that F. H. Prince of Boston, a director of the railroad, had personally agreed to finance the work. Mr. Freeman stated that if a permit for the construction of the line were granted his company would be in a position to begin work immediately.

William H. Williams, chairman of the board of the Rio Grande Western, related the events that led to the inception of the cut-off and declared that after the Missouri Pacific acquisition of a half interest in the D. & R. G. W. there were four solutions of the problem. These involved purchase of control of the D. & S. L., negotiation of trackage rights following construction by some company other than the D. & R. G. W., independent operation by the D. & S. L. with either road constructing the cut-off, or construction of an independent line by the D. & R. G. W. On September 20, Mr. Williams testified that surveys are now in progress for the construction of a new line, including a six-mile tunnel, at a possible cost of \$20,000,000.

Mr. Williams also stated that at a conference at Chicago on August 6 and 7, the D. & R. G. W. had offered to pay an annual rental of \$690,000 for use of the cut-off. On September 12, the D. & R. G. W. sent a formal proposition for a joint trackage contract to the D. & S. L. which was signed by M. Williams and T. M. Schumacher, chairman of the executive committee of the D. & R. G. W. and the Western Pacific. The proposal, which has not been accepted, provided for the fixing of the reproduction value of the new line by arbitration, with Ralph Budd, president of the Great Northern, as the arbiter, and with interest charges based on a 5½-per cent rate on the valuation of the joint property to be prorated among the users. Taxes, tunnel rent and maintenance were to be shared equally, with each road paying its own exclusive operating expenses, joint operating expenses to be prorated on a wheel-

age basis. The D. & S. L., under this agreement, would rebuild tunnels, eliminate curvature in excess of 10 deg., make rail renewals with 100-lb. rail and lay 110-lb. rail on curves greater than 6 deg. The cut-off would be owned and financed by the D. & S. L. and the contract would be effective during the life of the D. & S. L. W. charter.

William Wyer, statician for the Rio Grande Western, presented testimony to show that operation of the cut-off by the Denver & Salt Lake would cause a loss of \$964,400 to his road during the first year and with operation under a trackage agreement he estimated the loss at \$343,600. He declared that the cost of construction of the Dotsero cut-off would be about \$3,400,000 and that the D. & S. L. would be forced to spend about \$350,000 per year for the maintenance of a traffic organization. Under the proposed trackage agreement the D. & R. G. W. would have a net income of \$372,000 from operation over the cut-off in the fifth year, the D. & S. L. receiving a rental of \$740,000 per year for use of its tracks.

The Track Supply Exhibit

Fifty-four firms presented displays of equipment and materials in the exhibit of the Track Supply Association, held at the Book-Cadillac hotel, Detroit, Mich., on September 18-20, in conjunction with the convention of the Roadmasters' and Maintenance of Way Association. As in past years this exhibit consisted of full-size units, including, at least a dozen devices presented for the first time. By reason of its practical character the exhibit attracted a great deal of attention from the railway men attending the meeting.

The officers of the association who have been responsible for the exhibit included the following: President, J. Howard Horn, sales manager, National Lock Washer Company, Newark, N. J.; vice-president, F. E. McAllister, president and general manager, Kalamazoo Railway Supply Company, Kalamazoo, Mich.; secretary-treasurer, A. H. Told, general manager, Positive Rail Anchor Company, Chicago; advisory directors, Elmer T. Howson, western editor, *Railway Age*, Chicago; R. A. Van Houten, vice-president, Sellers Manufacturing Company, Chicago; directors, W. W. Glosser, manager electrical department, Hubbard & Co., New York; L. P. Shanahan, American Steel & Wire Company, Chicago; B. J. Wilson, western representative, The Pocket List of Railroad Officials, Chicago; and D. J. Higgins, American Valve & Meter Company, Chicago.

At the annual meeting of the Association, held on Wednesday morning the following officers were elected for the ensuing year: President, F. E. McAllister; vice-president, L. P. Shanahan; secretary-treasurer, L. C. Ryan, Oxweld Railroad Service Company, Chicago; advisory directors, E. T. Howson and R. A. Van Houten; directors, W. W. Glosser, L. S. Walker, P. & M. Company, New York, and George T. Willard, Railroad Supply Company, Chicago.

The names of the companies exhibiting

together with the character of their exhibits and the names of their representatives follow:

American Chain Company, Inc., Bridgeport, Conn.; guard rail clamps, one-piece guard rails, rail benders, compromise joints; J. J. O'Connell, A. H. Weston and W. I. Clock.

American Hoist & Derrick Company, St. Paul, Minn.; illustrations and photographs of ditchers, shovels, locomotive cranes, and supply-train cranes; Ward B. Maurer, Miss H. M. Hoeller and G. J. Heck.

American Fork & Hoe Company, Cleveland, Ohio; rail anchors and tapered rail joint shims; A. F. Fifield, S. L. Henderson, J. T. Reagan, E. Keough, F. C. Stowell, J. Christie, R. C. Violet, J. J. Noland and J. H. Dooling.

American Steel & Wire Company, Chicago; fencing, fence posts, signal wire, bonds, wire rope, nails, concrete reinforcement and snow fence posts; T. Haskell, A. W. Froude, and C. A. Cochran.

American Valve & Meter Company, Cincinnati, Ohio; wheel flange and rail lubricators; J. T. McGarry, J. W. McGarry, and D. J. Higgins. American Switch Point Protector and Equipment Company, Inc.; Denver, Colo.; Switch point protector; W. L. Griffith.

Ames Shovel & Tool Company, Boston, Mass.; exhibit showing various steps in the manufacture of track shovels; N. E. Brooks and Norbert T. Jacobs.

Balkwill Manganese Crossing Company, Cleveland, Ohio; model of manganese crossing; S. Balkwill.

Bethlehem Steel Company, South Bethlehem, Pa.; rail anchors, switch stands, hook-flange guard rail, gage rods and braced flangeway guard; N. E. Salsich, R. P. Deghuet, A. H. Koch, C. Cecil, J. L. Tygart, G. L. Moore, T. E. Hooper, and J. Tully.

Buda Company, Harvey, Ill.; motor cars, jacks and track liners; H. C. Beebe, A. J. Walch and A. H. Deimel.

Chase Appliance Company, New York; rail chair silencer and rail anchor tie plate; Warren Osborn.

Chimman Chemical Engineering Company, Bound Brook, N. J.; skid type weed sprayer, plans of other types of weed spraying equipment and dry chemical dusting cans; E. C. McClintic and A. F. De Vault.

Cullen-Friedest Company, Chicago; motion picture of rail cranes in operation; E. P. Cullen, Thomas D. Crowley and William C. Bamber.

Duff Manufacturing Company, Pittsburgh, Pa.; track jacks, bridge jacks and tie spacers; C. N. Thulin, W. G. Robb, E. E. Thulin, Dave Evans and J. W. Gibson.

Edison, Thomas A., Inc., Bloomfield, N. J.; electric-light switch lamp, primary and storage battery cells and parts, night box for motor cars, and small hand lantern; F. S. Stallknecht, C. R. Heron and P. A. Garrity.

Fairbanks, Morse & Co., Chicago; B. S. Spaulding, F. M. Condit, D. K. Lee, J. L. Jones, F. J. Lee, and E. C. Golladay.

Fairmont Railway Motors, Inc., Fairmont, Minn.; Fairmont and Mudge products—light section car, standard section car, heavy duty section car, standard inspection car, cutaway model of motor car engine, wheel-axle-bearing assembly and model of trailer frame; Albert C. Force, W. F. Kasper, Robert D. Sinclair, K. K. Cavins, A. R. Fletcher, W. D. Brooks, E. R. Mason, John T. McMahon, and V. Pagett.

Hayes Track Appliance Company, Richmond, Ind.; model of derail, bumping post and wheel stop; A. W. Booroom, E. L. Ruby and P. C. McClure.

Hubbard & Co., Pittsburgh, Pa.; shovels, track tools, nut locks and shovels; J. S. Wincrantz and W. W. Glosser.

Ingersoll-Rand Company, New York; literature on pneumatic tie tamper, rail drill, nutting machine, bonding drill, concrete breaker, spike puller and spike driver; W. H. Armstrong, G. W. Morrow, F. J. Ursem, T. H. Wiegand and G. E. Bridge.

Ingot Iron Railway Products Company, Middletown, Ohio; literature on ingot iron and culverts; A. W. Spaulding, H. M. Arrick, J. L. Young and A. W. Bryant.

Jordan Company, O. F., East Chicago, Ind.; moving pictures of spreader and track oiler; A. L. Greenbaum, J. C. Forbes, A. W. Banton, H. W. Protzeller and J. H. Mulholand.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.; motor cars, supervisor's track gage and level; F. E. McAllister, R. E. Keller, and L. W. Bates.

Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.; hand and power driven tool grinders; L. J. Cooney, S. S. Newman and Waldo E. Bugbee.

Lundie Engineering Corporation, New York; tie plates; L. B. Armstrong and G. W. Nibbe.

Maintenance Equipment Company, Chicago; switch point protector, model of friction car stop, and literature on hand and power rail layers, power track ballaster, flange and rail lubricator and steel fence posts; A. L. Arnold and J. A. Roche.

Mechanical Manufacturing Company, Chicago; model of bumping posts; H. E. Johnson.

National Highway Crossing Company, Burlington, Iowa; section of all-steel highway crossing; Fred Gerth, E. H. Batchelder, Jr., and Waldo E. Bugbee.

National Lock Washer Company, Newark, N. J.; spring washers; F. B. Archibald, G. La Rue Masters, W. R. Hillary, R. L. Cairncross and A. T. Hyatt.

Nordberg Manufacturing Company, Milwaukee, Wis.; motion pictures of track shifter, raise and full revolving track crane; W. W. Fitzpatrick and Victor F. Larson.

Northwestern Motor Company, Eau Claire, Wis.; photographs of transmission drive for heavy-duty motor cars, light inspection car, motor car discing equipment, gas-electric power plant and trailer; A. H. Nelson, Otis B. Duncan, Allan Datesman and G. H. Goodell.

Oxweld Railroad Service Company, Chicago; welding and cutting apparatus; L. C. Ryan, H. Kofmehl, J. E. Winslow, F. J. Duffie, W. E. Campbell, F. H. Lurquin, D. H. Pittman and L. A. Woodward.

P. & M. Company, Chicago; anti-rail creepers and bond-wire protectors; D. T. Hallberg, J. E. Mahoney, C. E. Webster, L. S. Walker, J. J. Byrne, S. M. Clancey, E. J. Van Patten and F. E. Rodman.

Pocket List of Railroad Officials, New York; copies of publication; B. J. Wilson.

Positive Rail Anchor Company, Chicago; girder type guard rail, rail anchors and guard rail plates and braces; A. H. Told and L. C. Ferguson.

Q. & C. Company, New York; guard rail clamp, compromise joint, switch point guard, flangeway guards and derails; J. L. Terry, L. Thomas, L. E. Hassman.

Rail Joint Company, New York; insulated joints, compromise joints, standard joints, head-free joints, reinforced joints, track liner and head-free rail; Alexander Chapman, D. L. Braine, H. C. Hickey, C. B. Griffin, J. N. Meade, Charles Jenkinson, E. B. Bishop, W. E. Cadd, Milton Markley, E. F. Schermhorn and E. A. Condit, Jr.

Railroad Supply Company, Chicago; tie plates; George T. Willard and John Hensel.

Railway Purchases and Stores, Chicago; copies of Railway Purchases and Stores; Edward Wray, and K. F. Sheeran.

Ramapo-Ajax Corporation, Hillburn, N. Y.; automatic switch stand, double-shoulder switch plate, switch clip, manganese flange switch guard, adjustable switch brace, guard rail clamp, forged braces, rail expander, and gearless switch stand; T. E. Akers; W. Bender, George Cooper, J. E. Davidson, Jr., D. Fairback, D. F. Hilton, P. Hoffman, J. V. Houston, John Hutchins, G. A. Carlson, R. W. Payne and J. B. Strong.

Reliance Manufacturing Company, Massillon, Ohio; spring washers; Robert Shireman, E. D. Cowlin, and H. R. Hanna.

Reade Manufacturing Company, Jersey City, N. J.; moving picture showing application of chemical weed killer; R. W. Pritchard.

Sellers Manufacturing Company, Chicago; wrought iron tie plates and wrought iron guard rail tie plates; R. A. Van Houten, George M. Hogan and R. J. Platt.

Simmons-Boardman Publishing Company, New York; copies of *Railway Age* and *Railway Engineering and Maintenance*; E. T. Howson, F. C. Koch, W. S. Lacher, H. E. McCandless and J. M. Rutherford.

Skelton Shovel Company, Dunkirk, N. Y.; track shovels; E. W. McCarty, H. C. Branahl, Archie Milligan and R. J. Pinder.

Snap-on Wrench Company, Chicago; socket wrenches and rail ratchet wrench; C. Tennyson, F. W. Becker and A. M. Crandall.

Syntron Company, Pittsburgh, Pa.; electric tie tampers, rail drills, spike drivers, arc welders and rail wrench; E. D. Jackson, D. G. Black and C. A. McKee.

Templeton, Kenly & Co., Ltd., Chicago; rail puller and expander, track jacks, bridge jacks, emergency jacks, screw jacks and tie spacing shoes; George Mayer.

United States Graphite Company, The, Saginaw, Mich.; Graphite curve grease; Walter R. Pfisterer.

Union Switch & Signal Company, Swissvale, Pa.; insulated rail joints and hand throw switch movement; J. J. Cozzens.

Warren Tool & Forge Company, Warren, Ohio; adzes, clawbars, lining bars, picks, spike mauls, sledges, hammers, track chisels, wrenches, gages and levels; Howard Mull and E. L. Ruby.

Western Wheeled Scraper Company, Aurora, Ill.; model of dump car and moving pictures and photographs; Jay Huber and Jesse Moss-grove.

Woodings Forge & Tool Company, Verona, Pa.; track tools and rail anchors; R. J. McComb, C. L. Woodings and R. J. Woodings.

Wooley Machine Company, Minneapolis, Minn.; model of tie scoring machine, photographs, new control-type weed burner, rail-joint oiler and track bolt tightener; H. A. Rogers.

Non-Exhibiting Members

Chicago Pneumatic Tool Company, Chicago. Creepcheck Company, Hoboken, N. J. Electric Tamper & Equipment Company, Chicago.

National Malleable & Steel Castings Company, Cleveland, Ohio.
 Pettibone-Mulliken Company, Chicago.
 St. Louis Frog & Switch Company, St. Louis, Mo.
 Verona Tool Works, Pittsburgh, Pa.
 William Wharton, Jr., & Co., Easton, Pa.
 Wyoming Shovel Works, Wyoming, Pa.

Western Railways State Position In Wage Dispute

The Conference Committee of Managers of the Western Railways, following the failure of the wage negotiations between the railroads and the Brother-

hood of Railroad Trainmen and the Order of Railway Conductors on September 18, has addressed a letter, containing a statement of the differences in the controversy and which presents the railroad viewpoint in the matter, to all officers and employees of western railroads. The demands and conditions set up by both the employees and the railroads as necessary to the full settlement of the dispute, which have been known only in a general way, are given in detail in this letter. It was signed by J. W. Hig-

gins as chairman of the conference committee.

"The negotiations opened July 16, 1928", the letter states. "The organization demanded: (1) Increases ranging from 16 to 28 per cent, (2) 34 cents per day for passenger men handling United States mail, (3) A rule which would give through-freight crews local freight rates if they stopped once between terminals on a trip to set out or pick up a car.

(Continued on page 638)

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 185 Steam Railways, Including 16 Switching and Terminal Companies.

FOR THE MONTH OF JULY, 1928 AND 1927

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Average number of miles operated	240,425.22	239,197.35	59,356.93	59,447.18	5,627.81	5,617.85	40,182.37	39,766.42	135,258.11	134,365.90
Revenues:										
Freight	\$381,575,545	\$370,111,540	\$162,084,819	\$160,634,200	\$19,039,767	\$20,072,206	\$46,960,400	\$48,868,941	\$153,490,559	\$140,536,193
Passenger	982,721,508	991,637,187	44,111,002	48,551,724	1,381,881	1,679,479	8,888,429	10,448,887	28,340,196	30,977,097
Mail	7,953,093	7,706,780	3,097,984	2,941,290	199,045	191,505	1,129,150	1,150,356	3,526,914	3,423,629
Express	10,410,142	9,979,895	4,780,404	4,331,691	221,071	213,294	928,613	1,358,754	4,480,054	4,076,156
All other transportation	17,868,863	17,559,077	10,191,235	9,975,803	199,722	208,508	877,217	962,918	6,600,689	6,411,848
Incidental	11,643,221	11,960,639	5,694,198	5,756,650	276,910	387,220	961,903	1,034,909	4,710,210	4,781,860
Joint facility—Cr.	1,174,895	1,137,205	475,747	467,685	10,686	15,694	169,895	172,093	518,567	481,733
Joint facility—Dr.	393,814	431,512	137,921	140,518	4,619	2,161	24,654	33,145	226,620	255,688
Ry. operat'g revenues	512,953,453	509,680,811	230,297,468	232,518,525	21,324,463	22,765,745	59,890,953	63,963,713	201,440,569	190,432,828
Expenses:										
Maintenance of way and structures	77,458,009	79,583,733	31,785,064	32,850,541	3,243,463	3,253,897	9,440,200	10,110,442	32,989,282	33,368,853
Mainten'ce of equip'm't	95,854,177	100,385,228	44,434,889	46,466,776	4,150,573	4,809,894	12,637,841	13,532,285	34,630,874	35,576,273
Traffic	10,834,105	10,406,530	4,047,253	3,872,595	267,887	281,997	1,688,876	1,728,203	4,830,089	4,523,735
Transportation	171,566,973	174,315,601	79,845,844	82,415,381	5,400,988	5,942,955	21,362,047	22,761,763	64,958,094	63,195,502
Miscellaneous operat'ns	5,057,706	4,993,188	2,251,327	2,221,198	71,915	78,697	418,401	430,253	2,316,063	2,263,040
General	16,079,316	15,865,514	7,175,791	7,148,540	611,705	561,863	2,087,823	2,067,529	6,203,997	6,087,582
Transportation for investment—Cr.	1,360,387	1,637,887	275,970	273,811	23,929	60,502	49,190	106,370	1,011,298	1,197,204
Ry. operat'g expenses	375,489,899	383,911,907	169,264,198	174,701,220	13,722,602	14,868,801	47,585,998	50,524,105	144,917,101	143,817,781
Net revenue from railway operations	137,463,554	125,768,904	61,033,270	57,817,305	7,601,861	7,896,944	12,304,955	13,439,608	56,523,468	46,615,047
Railway tax accruals	32,592,569	31,308,319	13,990,072	12,952,454	1,568,639	1,723,988	3,925,810	3,986,845	13,108,048	12,645,032
Uncollectible ry. rev's	83,192	110,697	35,151	37,676	1,633	3,926	13,701	24,795	32,707	44,300
Ry. operating income	104,787,793	94,349,888	47,008,047	44,827,175	6,031,589	6,169,030	8,365,444	9,427,968	43,382,713	33,925,715
Equip't rents—Dr. bal.	7,494,562	7,201,220	4,105,409	3,798,945	4,622,308	4,514,988	3,203	122,858	4,014,664	3,794,405
Joint facility rent—Dr. balance	2,066,952	2,009,696	985,121	1,019,026	92,336	75,261	105,554	127,770	883,941	787,639
Net railway operating income	95,226,279	85,138,972	41,917,517	40,009,204	6,561,561	6,608,757	8,263,093	9,177,340	38,484,108	29,343,671
Ratio of expenses to revenues (per cent)...	73.20	75.32	73.50	75.13	64.35	65.31	79.45	78.99	71.94	75.52

FOR SEVEN MONTHS ENDED WITH JULY, 1928 AND 1927

Average number of miles operated	239,994.28	238,966.27	59,335.01	59,445.12	5,624.27	5,616.76	40,082.83	39,676.52	134,952.17	134,227.87
Revenues:										
Freight	2,570,240,500	2,634,135,884	1,118,555,363	1,176,088,311	128,700,718	144,901,485	345,147,476	366,695,680	977,836,943	946,450,408
Passenger	6,524,188,993	6,570,494,198	272,119,044	290,116,897	9,989,206	12,011,676	68,874,930	77,458,290	173,205,813	190,907,335
Mail	55,438,467	54,837,716	21,021,202	20,892,416	1,463,985	1,425,728	8,223,483	8,178,382	24,729,797	24,341,190
Express	77,490,527	76,822,497	35,454,463	35,526,593	1,725,497	1,730,759	10,311,150	10,462,912	29,999,417	29,102,233
All other transportation	118,037,707	119,688,795	66,613,439	67,157,864	1,337,936	1,462,137	6,990,492	7,561,599	43,095,840	43,507,195
Incidental	69,229,977	73,545,021	34,749,725	36,879,474	2,143,148	2,777,888	7,779,539	8,278,867	24,557,565	25,608,792
Joint facility—Cr.	7,820,189	8,056,627	3,062,009	3,210,542	85,971	101,713	1,016,628	1,204,563	3,655,581	3,539,809
Joint facility—Dr.	2,636,540	2,950,587	928,654	946,308	29,960	16,285	213,329	233,778	1,464,597	1,754,216
Ry. operat'g revenues	3,419,809,820	3,534,630,151	1,550,646,591	1,628,925,789	145,416,501	164,395,101	448,130,369	479,606,515	1,275,616,359	1,261,702,746
Expenses:										
Maintenance of way and structures	485,864,193	505,513,620	198,105,344	208,188,184	21,329,166	22,721,818	64,529,270	70,747,770	201,900,413	203,855,848
Mainten'ce of equip'm't	682,334,244	722,176,510	317,972,427	343,948,119	31,341,875	35,076,609	91,322,349	95,831,788	241,697,593	247,319,994
Traffic	73,491,694	70,619,973	27,191,008	25,913,191	1,874,651	1,848,384	12,290,923	12,297,602	32,135,112	30,560,796
Transportation	1,202,777,721	1,259,871,420	564,745,467	601,239,899	38,818,759	43,232,968	158,040,856	169,889,207	441,172,639	445,509,346
Miscellaneous operat'ns	32,321,471	32,496,942	15,045,429	15,093,958	576,372	602,892	3,698,493	3,801,401	13,001,177	12,998,691
General	113,022,989	112,170,109	50,441,655	50,897,975	4,278,139	3,951,323	14,662,042	14,715,263	43,641,153	42,605,548
Transportation for investment—Cr.	8,656,666	8,405,811	1,369,297	1,515,129	203,008	284,498	560,355	903,847	6,524,006	5,702,337
Ry. operat'g expenses	2,581,155,646	2,694,442,763	1,172,132,033	1,243,766,197	98,015,954	107,149,496	343,983,578	366,379,184	967,024,081	977,147,886
Net revenue from railway operations	838,654,174	840,187,388	378,514,558	385,159,592	47,400,547	57,245,605	104,146,791	113,227,331	308,592,278	284,554,860
Railway tax accruals	214,465,224	216,682,203	89,230,160	88,950,303	11,502,921	12,435,976	28,859,795	29,012,840	84,872,348	86,283,084
Uncollectible ry. rev's	766,181	895,252	386,040	364,301	11,654	31,624	116,055	146,917	252,432	352,410
Ry. operating income	623,422,769	622,609,933	288,898,358	295,844,988	35,885,972	44,778,005	75,170,941	84,067,574	223,467,498	197,919,366
Equip't rents—Dr. bal.	52,037,809	49,908,146	28,407,497	27,910,897	43,634,304	43,349,579	4,008,932	4,909,422	23,255,684	20,437,406
Joint facility rent—Dr. balance	14,133,518	14,534,807	7,126,809	7,025,024	767,585	711,617	491,119	767,923	5,748,005	6,030,243
Net railway operating income	557,251,442	558,166,980	253,364,052	260,909,067	38,752,691	47,415,967	70,670,890	78,390,229	194,463,809	171,451,717
Ratio of expenses to revenues (per cent)...	75.48	76.23	75.59	76.35	67.40	65.18	76.76	76.39	75.81	77.45

^a Includes \$3,432,920 sleeping and parlor car surcharge. ^b Includes \$3,539,372 sleeping and parlor car surcharge. ^c Includes \$22,826,098 sleeping and parlor car surcharge. ^d Deficit or other reverse items. ^e Includes \$23,260,021 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

News of the Week

(Continued from page 637)

"The Conference Committee of Managers made requests for concurrent changes, viz: (1) Eliminate restriction on passenger crew assignments, (2) eliminate tonnage, car-limit, double-header and helper district restrictions, (3) eliminate or modify rules that require unnecessary employees or service, (4) reduce higher than standard rates to standard, and eliminate rules requiring double payments for the same service."

The letter then traces the progress of the negotiations from July 27 when the brotherhoods reduced their demands to 7½ per cent for road conductors and trainmen and the 34-cent allowance for handling mail, with no changes in rules. The roads then made an alternative proposal of a 6½ per cent increase with no changes in rules or a 7½ per cent increase with elimination of the double-heading, helper-districts, car and tonnage-limit rules, which affect about 28 per cent of the men involved in the negotiations.

"The conductors' and trainmen's organizations rejected both alternative proposals of the Conference Committee of Managers", the letter continues, "refused to arbitrate the differences in dispute, and on August 8 spread a strike ballot on all roads involved, based on a statement purporting to give to the men the differences between us as of that date. The statement that accompanied the strike ballot to the men made the allegation that 'all tentative proposals are withdrawn', leaving the inference that the railroads had withdrawn their proposals and were insisting on all the changes requested in their original submission. As a matter of fact, the railroads' first alternative of August 1, which is still open, said, 'keep all your rules and take 6½ per cent increase in rates,' and the second said, 'take 7½ per cent increase in rates upon the elimination of the double-header rule, or arbitrate the difference.' The double-header rule was the only difference between us. We had given verbal assurance that if, and when, the general increase had been settled we would satisfactorily dispose of collateral issues, such as 34 cents for handling United States mail and the effective date".

While the strike vote was being polled and before the result could be known the presidents of the conductors' and trainmen's organizations and representatives of the Conference Committee of Managers met with the Board of Mediation in its office at Washington, and on August 28 an agreement was signed, the principal provisions of which were as follows:

"(1) The railroads shall grant an increase of 7½ percent on present Western basic standard rates to conductors, assistant conductors, ticket collectors, baggagemen, flagmen and brakemen, and to other service, viz: The same increases shall apply to milk, mixed, work, miscellaneous, or any service not enumerated, as are applied to the service in

which they are now classified. Where there is a separate rate for milk, mixed, work, miscellaneous or other service, it shall be increased in the same amount of money compared with rates in effect this date, as the freight or passenger rate, according to the overtime basis on which it is calculated. All rates of pay in excess of standard rates and all mountain, desert or other differentials to be maintained—that is, the same amount of money now paid in excess of standard rates to be paid in excess of rates that may be agreed upon. All the foregoing increases to be effective as of May 1, 1928."

"(2) In addition to the increase of 7½ per cent herein provided, baggagemen handling mail shall be paid on the same basis and subject to the same interpretations as now established in the case of like employees on the so-called Eastern Railroads—effective as of September 1, 1928."

"(3) Each carrier may take up in the usual way with its general committees of conductors and trainmen cases where it is claimed that the double-header, helper-district, car-limit and tonnage-limit rules produce burdensome of objectionable conditions."

"The requests for changes are to be confined to relief at or between particular named points or areas, with the purpose of special but not general modification of these rules. No other rules are to be considered under the provisions of this agreement."

"All differences between us were removed when the presidents of the organizations signed the agreement at Washington," the letter concludes, "This agreement was before the general committees at Chicago until September 9. It was repudiated by them because it provided for arbitration of such disputes as might arise under its limited provisions. Colonel Winslow, Governor Morrow and Mr. Hanger, the three members of the Board of Mediation, came to Chicago on September 12, at the request of the organizations, but effected no change in the situation."

"The agreement signed at Washington did not permit a general modification of the double-header rule, much less its elimination, as the roads had desired. It confined requests for relief to particular named points or areas, with the purpose of special but not general modification of the rule."

THE LONDON, MIDLAND & SCOTTISH and the London & North Eastern will soon place third class sleeping cars in service on several of their trains. These cars are designed with compartments, each compartment having two lower and two upper berths. Charges for sleeping accommodations, in addition to the regular fare, will be approximately \$1.50 between stations in England and Wales and between local stations in Scotland and approximately \$1.75 between stations in England and Scotland. The berths are provided with upholstery and steamer rugs—no linens. The accommodations are thus couches, rather than beds.

Traffic

The Boston & Maine announces that with its new timetable, beginning on the last day of September, 75 per cent of all its through passenger trains will be made faster than at present. The "Flying Yankee," between Boston and Portland, 115 miles, is to run through without a stop, either northbound or southbound, in two hours, 20 minutes.

The Empire state express of the New York Central, running between New York and Buffalo, 438 miles, in nine hours, which has been run six days in the week since October 26, 1891, and which for years was the fastest train in the world for that distance, is henceforth to be run on Sundays also.

The American Association of Railroad Ticket Agents held its annual meeting at Seattle, Wash., on September 14 at which time T. I. Newman, ticket agent of the Erie at New York, was elected president and W. A. Bailey, Atlanta, Ga., vice-president; and E. R. Hutton, Chicago, was re-elected secretary-treasurer. New Orleans, La., was chosen as the place of the 1929 convention. Among the railroad officers who addressed the meeting were Z. G. Hopkins, assistant to the president of the Missouri-Kansas-Texas, E. E. Nelson, passenger traffic manager of the Northern Pacific, A. Cotsworth, Jr., passenger traffic manager of the Chicago, Burlington & Quincy and E. L. Bevington, chairman of the Transcontinental Passenger Association.

Wheat Movement Heavy

Judging by the present traffic, the movement of western grain will this year establish a new record. Since September 1, the movement to the head of the lakes, Duluth, Minn., and Superior, Wis., has been at a rate equal to the daily unloading capacity of the elevators. For two weeks the daily loadings and movement of cars at country elevators, consigned to these two points, has exceeded the unloading capacity of the terminals. On September 18, a total of 2,128 cars were started for terminal markets from originating points throughout the northwest and 60 per cent of them, or 1,276 cars were billed for Duluth and Superior. On September 12, a total of 7,271 cars of grain were held in Duluth and Superior yards, awaiting unloading while 4,616 cars were at the same time being moved toward the head of the lakes.

Present indications point to the harvesting of the largest wheat crop ever reaped in Canada, amounting to 550,482,000 bu., according to the Dominion Bureau of Statistics. This will be the first time the wheat crop has ever passed the half billion mark, the largest crop in any former year being 474,199,000 bu. in 1923. On September 18, 9,311,272 bu. of grain was brought into Winnipeg, Man., from tributary territory, this being the record for that district.

Equipment and Supplies

Locomotives

THE ILLINOIS TERMINAL COMPANY is inquiring for 1 Mikado type locomotive.

THE DENVER & RIO GRANDE WESTERN is inquiring for 10 locomotives of the 4-8-4 type.

THE CENTRAL VERMONT has ordered 2 locomotives of the 2-10-4 type from the American Locomotive Company. These locomotives are similar to an order for eight placed with the same company, and reported in the *Railway Age* of July 21.

THE CANADIAN NATIONAL has ordered 20 locomotives of the 4-8-4 Northern type, from the American Locomotive Company through the Montreal Locomotive Works, Ltd. These locomotives are of the same general design as the 6100 class and will be used for both freight and passenger service. An additional order for 10 eight-wheel switching locomotives has been given to the American Locomotive Company through the Montreal Locomotive Works, Ltd. and an order for 15 Santa Fe type locomotives and 10 eight-wheel switching locomotives has been given to the Canadian Locomotive Company. This makes a total of 55 locomotives for which inquiry was reported in the *Railway Age* of September 8. The railroad is inquiring for 5 additional locomotives, of a modified design from the Mountain type, now used on main line for both freight and passenger service.

Freight Cars

THE CANADIAN NATIONAL is inquiring for 1500 box cars and 30 tank cars.

THE FREEPORT SULPHUR COMPANY, New York, is inquiring for 15 steel hopper car bodies.

THE CENTRAL VERMONT is inquiring for 500 automobile cars, of the rear end load type.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 10 transformer cars of 182,000 lbs. capacity, from the Osgood Bradley Car Company.

THE CERRO DE PASCO COPPER CORPORATION, New York, has ordered 20 freight cars from the American Car & Foundry Co.

THE UNION TANK LINE is inquiring for 100 to 200 tank cars, of 10,000 gallon capacity, and for 100 to 200 tank cars of 6500 gal. capacity.

THE GREAT NORTHERN is inquiring for 500 additional steel underframes. A previous order for 2000 was given to its own shops as was reported in the *Railway Age* of September 8.

THE AMERICAN RAILROAD OF PORTO RICO has ordered 100 cane cars from the Gregg Company, Ltd. Inquiry for this equipment was reported in the *Railway Age* of August 11.

THE SANITARY DISTRICT OF CHICAGO has ordered 16 air dump cars of 30 cu. yd. capacity, and 4 air dump cars of 20 cu. yd. capacity, from the Magor Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of August 25.

Passenger Cars

The Denver & Rio Grande Western is inquiring for 4 dining cars.

THE CANADIAN NATIONAL is inquiring for 25 first class coaches, 16 sleeping cars and 2 combination baggage and smoking cars.

Iron and Steel

THE CANADIAN NATIONAL is inquiring for its year's rail requirement.

THE ERIE has received bids on 235 tons of steel for a bridge at Youngstown, Ohio.

THE SOUTHERN has received bids on 2300 tons of steel, for an office building in Washington, D. C.

THE PENNSYLVANIA is inquiring for 3300 tons of steel, for bridges at various locations.

THE CHESAPEAKE & OHIO has divided an order for 45,500 tons of rails between the Illinois Steel Company, the Bethlehem Steel Company and the Inland Steel Company.

THE UNION PACIFIC has divided an order for 40,000 tons of rails between the Colorado Fuel & Iron Company, the Illinois Steel Company and the Inland Steel Company.

THE GREAT NORTHERN has divided an order for 15,000 tons of rails between the Inland Steel Company, the Illinois Steel Company and the Bethlehem Steel Company.

THE NEW YORK CENTRAL has ordered 110 tons of steel from the Mount Vernon Bridge Company for a bridge at Kankakee, Ill. An order for 635 tons of steel has been given to the Phoenix Bridge Company, for use in improvements at Park avenue, New York.

Machinery and Tools

THE CHICAGO & NORTH WESTERN is inquiring for one 32-in. shaper.

THE RICHMOND, FREDERICKSBURG & POTOMAC is in the market for a number of machine tools.

THE NILES-BEMENT-POND COMPANY has received orders for railroad equipment machine tools, including one combination general turning and axle lathe; one number three double axle lathe and two number three axle lathes.

Supply Trade

J. F. Hoerner, assistant to vice-president of the Baldwin Locomotive Works, at New York, has been appointed manager, in charge of the New York office, of the Baldwin Locomotive Works and the Standard Steel Works Company, succeeding James McNaughton, vice-president, deceased.

Hal F. Wright has been appointed assistant to general manager of sales, in addition to his other duties, of the American Chain Company Inc., and associate companies, with headquarters at Bridgeport, Conn.

R. K. Weber, vice-president of the Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., has been elected president to succeed W. C. Arthurs, deceased, and will be succeeded by H. H. Cust, assistant to the president.

A. L. Datesman has been appointed sales representative for Otis B. Duncan, manufacturer's representative, 53 W. Jackson boulevard, Chicago, effective October 1. Mr. Datesman was formerly connected with the purchasing department of the Pennsylvania, at Pittsburgh, Pa., and Philadelphia and was more recently associated with the Railway Products Company, Pittsburgh.

E. J. Phillips, who has represented the Van Dorn Electric Tool Company, Cleveland, Ohio, in the sale of its products at Detroit, is now located at San Francisco, Cal., having taken over that territory for the same company; he is succeeded in Michigan by George Phillips; J. F. Spaulding has been transferred to the Baltimore territory to take the place of J. Beggs, who has been transferred to the main office at Cleveland.

The Lincoln Electric Company, Cleveland, Ohio, has opened an office at 533 Market street, San Francisco, Cal., with W. S. Stewart in charge. L. P. Henderson, formerly of the Chicago office, has been placed in charge of the Minneapolis district. Robert Notvest has been transferred from Kansas City, Mo., to Indianapolis, Ind., where he will have charge of the Indianapolis district. He will be succeeded by R. E. Mason. N. L. Nye has been appointed representative at Akron, Ohio.

The St. Louis Car Company, St. Louis, Mo., has organized the Cardinal Aircraft Corporation as a subsidiary to build airplanes and parts. The capital, plant facilities and executive staff for this new department will be furnished by the St. Louis Car Company. It is estimated the first plane will be ready for demonstration and sale in the course of 60 or 90 days.

W. W. Fetner has been appointed southwestern representative of the Ulster Iron Works, with headquarters at 1941 Railway Exchange building, St.

Louis, Mo., to succeed L. S. Hassman, who resigned recently. Mr. Fetner was born in Macon, Ga., and attended the Alabama Polytechnic Institute. After serving for three and one half years as a machinist in the Macon shops of the Central of Georgia, he entered the railway supply business in the employ of the Edna Brass Manufacturing Company, at Cincinnati. Three years later he became an employee of the Bradford Corporation, with whom he has been associated for the last five years.

Ground was broken on August 29 for the new plant of the **Ames Shovel & Tool Company** which is to adjoin the company's present factory at North Easton, Mass. The new structure which will be a single story building, 400 ft. by 60 ft., will be of fireproof construction and equipped with modern machinery. The plant will also be arranged for line production. The removal of this company's general office from Boston to North Easton was reported in the *Railway Age* of September 1.

Obituary

George M. Haskell who has been in the service of the J. G. Brill Company since May, 1894 died in the Engineer Club, New York City, on September 22. Mr. Haskell was a sales representative in the electric railway division and for the past several years had devoted most of his time to the cities of New York and Boston.

W. C. Arthurs, president of the Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., who died on September 16, was born in Montgomery county, Ill. After being engaged in the manufacture of shoes at DeKalb, Ill., he entered the employ of the Litchfield Car and Machine Company in 1887, as cashier and paymaster, which position



W. C. Arthurs

he held during the ensuing two years. In 1890, he became secretary and treasurer of the Mt. Vernon Car Manufacturing Company and in 1897, was appointed receiver by the court. He held this position until 1902 when he was elected vice-president and treasurer. In 1908 he became president, which position he has held until his death.

Construction

ATCHISON, TOPEKA & SANTA FE.—A contract for the construction of a two-story brick building with outside dimensions of 26 ft. by 55 ft. in the freight yards at Topeka, Kan., has been let to George H. Gurtler & Co., Topeka.

BOSTON & MAINE.—A contract for the construction of a 600-ton storage capacity sand handling plant at Deerfield, Mass., has been let to the Roberts and Schaefer Company, Chicago. This plant will have a drying capacity of 50 tons per day.

CANADIAN PACIFIC.—This company contemplates the extension and improvement of its existing passenger terminal facilities at Calgary, Alta. A contract has been let to McDonald Brothers, Calgary, for the construction of an addition to the dining and sleeping car building at Calgary at a cost of about \$10,000.

CENTRAL OF GEORGIA.—This road has awarded a contract to the Brooks-Callaway Company, Atlanta, Ga., for grading 11,700 ft. of track to serve new coal mines in St. Clair County, Alabama. The work is expected to cost approximately \$120,000.

CHICAGO, BURLINGTON & QUINCY.—Bids have been closed by this company for the construction of a combined passenger and freight station at Cheyenne, Wyo. The project is expected to involve an expenditure of about \$75,000.

EUCLID.—This company has been authorized by the Interstate Commerce Commission to relocate its line in Cleveland, Ohio, for the purpose of eliminating dangerous curves and grade crossings and providing more adequate service to the industries served by its present tracks.

GREAT NORTHERN.—This company plans the construction of stockyards at Blackfoot, Mont., which will require an expenditure of about \$20,000.

MISSOURI PACIFIC.—A contract has been awarded to the Humes-Deal Company, St. Louis, Mo., for alterations to the Union passenger station at Little Rock, Ark., at a cost of \$40,000.

MOUND CITY & EASTERN.—The general contract for the construction of this railroad between Mound City, S. D., and Leola, 70 miles, has been let to the Jahnig and Davis Construction Company, S. D. Construction was started simultaneously on September 20 at Mound City and Leola. The total cost of the project is estimated at \$1,600,000. Present plans call for the construction of a line which will have a maximum grade of 1.1 per cent.

NEW YORK CENTRAL.—This road has awarded a contract to H. H. Sherwin & Co., Inc., New York for work in connection with the roofing of openings over its depressed tracks along Park avenue, New York. The call for bids on this work

was reported in the *Railway Age* issue of September 15.

NEW YORK, NEW HAVEN & HARTFORD.—A contract has been awarded to the Roberts and Schaefer Company, Chicago, for the construction of a gravity sand handling plant with steam dryer at Lamber-ton street, New Haven, Conn.

NORTHERN PACIFIC.—A contract for the construction of a two story addition to this company's hospital at Glendive, Mont., has been let to Edward J. Dunnigan, Inc., St. Paul, Minn., at a cost of about \$100,000.

OREGON ELECTRIC.—The date of hearing of the application of this company, a subsidiary of the Spokane, Portland & Seattle, to the Interstate Commerce Commission to construct a line between Albany, Ore., and Lebanon, 12 miles, has been set for October 13 at Portland, Ore. This company has been substituted in the proceeding for the original applicant, the Linn County Lumber & Railroad Company.

OREGON SHORT LINE.—This company plans, contingent upon the closing of the street to vehicular traffic, the construction of a passenger station at Shoshone, Idaho, at a cost of about \$130,000. Construction of a new freight station and additional yard facilities are also contemplated at Shoshone.

ST. LOUIS ELECTRIC TERMINAL.—This company has applied to the Interstate Commerce Commission for permission to construct an extension in St. Louis from McKinley bridge to the corner of Twelfth street and Washington avenue, to serve industrial territory. The projected line is 2.6 miles in length and construction will be financed by the Illinois Power & Light Corporation.

UNION PACIFIC.—Plans have been prepared for the construction of a viaduct over the tracks of this company at Cheyenne, Wyo., at a cost of about \$400,000, which will be borne jointly by the railroad and the city of Cheyenne.

AN IMMIGRATION PLAN similar to that recently negotiated by the Canadian Pacific has been effected by the Canadian National, as a result of conferences between Lord Lovat, chairman of the Overseas Settlement Board in London, and W. J. Black, director of colonization for the railway.

Of major importance in the plan is an agreement covering the bringing forward by the Canadian National of 1,000 British families, who, when they take up land of their own, will be assisted with a loan from the British Government for the purchase of stock and equipment, the necessary funds in this connection being administered by the land settlement department of the Canadian National. The keynote of this plan, is that under the scheme of settlement proposed, each family will be required to secure Canadian experience, and no loan will be made until the family has demonstrated its fitness for Canadian farm life and has accumulated small savings sufficient, together with a loan to start farming.

Financial

BALTIMORE & OHIO.—Abandonment.—This company has been authorized to abandon a portion of the Turner branch of the Coal & Coke Railway, 1.61 miles, in Kanawha county, W. Va.

CENTRAL INDIANA.—Continued Operation.—This company has been granted permission by the Interstate Commerce Commission to continue operation of that part of its Waveland Junction-Muncie line between Anderson and Lebanon, Indiana, 42 miles, and to abandon the remainder. Since the Commission on March 29, 1927 authorized the company to abandon all its lines, the Cleveland, Cincinnati, Chicago & St. Louis and the Panhandle, a subsidiary of the Pennsylvania, have offered to purchase the line between Anderson and Lebanon for \$500,000 and have concluded that the Central Indiana should continue to operate that part of its properties. The Commission has, accordingly, amended its original authorization.

CHICAGO, ROCK ISLAND & PACIFIC.—Abandonment.—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Iowa City to Elmira, Ia., 9.32 miles.

CHICAGO, BURLINGTON & QUINCY.—New Directors.—F. E. Williams, executive vice-president of the Burlington, and Greenville Kane, chairman of the finance committee of the Erie, were elected as members of the board of directors of this railroad and the Colorado & Southern at a meeting of the stockholders at Chicago on September 20.

CHICAGO & NORTH WESTERN.—Bonds.—This company has been granted authority by the Interstate Commerce Commission to procure authentication and delivery of \$28,456,000 of 4½ per cent first and refunding mortgage gold bonds to be held in the company's treasury subject to further order of the Commission.

COLUMBUS & GREENVILLE.—Notes.—This company has been authorized by the Interstate Commerce Commission to issue \$101,000 of promissory notes or lease warrants to the J. G. Brill Company in connection with the procurement of two gas-electric motor cars and two trailer cars.

DENVER & RIO GRANDE WESTERN.—Abandonment.—This company has been granted permission by the Interstate Commerce Commission to abandon its Floresta branch, extending from Crested Butte to Floresta, Colo., a distance of 10.7 miles.

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—Sale to Canadian Pacific.—The provincial government of Alberta announced on September 20 that it had completed negotiations, subject to the ratification of the Dominion and provin-

cial legislatures and the Canadian Pacific stockholders, for the sale of the E. D. & B. C., the Alberta & Great Waterways, the Central Canada, the Pembina Valley, and the Central Canada Express Company, to the Canadian Pacific for \$25,000,000. While not a party to these negotiations the Canadian National has been given until December 31, 1928, to express its desire to acquire a half interest in these railways on equal terms with the Canadian Pacific.

Conditions of the sale as set forth by E. W. Beatty, president of the Canadian Pacific provide for payment by the Canadian Pacific of \$15,580,000 with four per cent interest, of which \$5,000,000 is to be paid on June 1, 1929, \$5,000,000 within four years thereafter and \$5,580,000 within 10 years thereafter. The province is to be indemnified against liability on the \$7,000,000 first mortgage, four per cent debenture stock of the E. D. & B. C. which is due February 16, 1942, and the \$2,420,000 bonds due October 22, 1944. The Canadian Pacific is to assume all payments already made and commitments entered into for line extensions from Whitelaw to the Water Hole district, 15 miles, and from Wembley to Hythe, 25 miles, and agrees to construct 60 additional miles of branch lines in the Peace River district within five years.

Commenting on the acceptance of the C. P. R. offer J. E. Brownlee, premier of Alberta, stated that the total worth of the sale to the province will be about \$26,000,000 and that the figure is within \$3,000,000 of the replacement value of the roads as estimated by J. Callaghan, general manager. In March, 1928, a joint offer of the Canadian Pacific and the Canadian National of \$17,000,000 for the same properties, without the Alberta & Great Waterways, was refused by the Alberta government.

NAPLES, SEABOARD & GULF.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to procure authentication and delivery of \$104,000 of first mortgage 6 per cent bonds to be delivered to the Seaboard Air line in repayment of advances.

NEW YORK, CHICAGO & ST. LOUIS.—Notes.—This company has been authorized by the Interstate Commerce Commission to issue short-term promissory notes for an aggregate of \$5,000,000 to provide additional working capital and to meet other cash requirements.

PENNSYLVANIA, OHIO & DETROIT.—Acquisition.—This company has been authorized to acquire and the Pennsylvania Railroad, lessee, has been authorized by the Interstate Commerce Commission to operate a line, 9.12 miles, extending from Zanesville to Lawton, Ohio. Abandonment of the line by the Ohio River & Western had previously been authorized by the Commission.

UNION PACIFIC.—To Operate Spur.—This company has been authorized by the Interstate Commerce Commission to operate 2.91 miles of line in the Fairfax

industrial district of Kansas City, Kans., extending northward from the end of its Wyandotte spur.

WESTERN PACIFIC.—Acquisition of Union Belt of Oakland.—Denial of this company's application to acquire the line of the Union Belt Railway of Oakland, is recommended to the Interstate Commerce Commission in a proposed report by Examiner Ralph R. Molster. The examiner's report also recommends that the application of the Southern Pacific and Central Pacific to acquire the line should be denied without prejudice. The report states that it would seem to be in the public interest that permanent operation of the Union belt line by the Southern Pacific be assured but the reasonableness of the price of \$150,000 which the Southern Pacific has agreed to pay for the property is questioned. The examiner's report recommends rejection of the Western Pacific's application to build a line connecting with the Union belt on the ground that the new route would be inferior to and more expensive to operate than the Southern Pacific's present connection. Denial without prejudice of the Western Pacific's application to construct a connection with the Alameda belt line is recommended in the examiner's report, which states that even were there no opportunity for securing a rail connection over Southern Pacific lines, the doubt as to the wisdom of the proposal precludes granting of the authority sought until the actual cost of transfer by ferry can be approximated after sufficient trial and a better basis of judgment is afforded as to the cost, if any, for use by the Western Pacific of the drawbridge over the tidal canal.

YAZOO & MISSISSIPPI.—Abandonment.—This company has been authorized by the Interstate Commerce Commission to abandon a branch line extending from Lamont to Moores, Bolivar county, Miss., a distance of 4.36 miles.

Valuation Report

The Interstate Commerce Commission has issued a final valuation report finding the final value for rate-making purposes of the property owned and used for common-carrier purposes, as of the respective valuation date, as follows:

	Minneapolis Eastern	\$670,714	1919
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Average Price of Stocks and of Bonds

	Sept. 25	Last week	Last year
Average price of 20 representative railway stocks.	122.23	123.05	119.22
Average price of 20 representative railway bonds.	93.65	93.58	95.23

Dividends Declared

Kansas City Southern.—Preferred, \$1.00, quarterly, payable October 15 to holders of record September 29.
Midland Valley.—Common, 2½ per cent, semi-annually, payable October 15 to holders of record September 29.
Minneapolis, St. Paul & Sault Ste. Marie.—Leased lines.—2 per cent, payable October 1 to holders of record September 20.
Norfolk & Western.—Adjustment Preferred, \$1.00, payable November 19, to holders of record October 31.
Northern Pacific.—\$1.25, quarterly, payable November 1 to holders of record October 1.

Officers

Executive

W. J. Blake Wilson has been elected vice-president of the Pacific Great Eastern, with headquarters at Vancouver, B. C.

C. D. Hicks, office assistant to the president of the Missouri Pacific at St. Louis, Mo., has been promoted to executive representative of the Missouri Pacific and the Texas & Pacific in Mexico with headquarters at Mexico City, D. F., effective October 1. **E. F. Barnes, Jr.**, secretary to the president of the Missouri Pacific, has been promoted to office assistant to the president of that railroad, succeeding Mr. Hicks.

Benjamin W. Scandrett, general solicitor of the Northern Pacific, with headquarters at St. Paul, Minn., has been appointed vice-president with general jurisdiction, subject to the orders of the president, over all departments, effective October 1. Mr. Scandrett will have headquarters as before in St. Paul and the Northern Pacific, following the death of Howard Elliott, chairman of the board, will hereafter have no executive officer in New York.

William M. Jeffers, general manager of the Union Pacific, with headquarters at Omaha, Neb., has been elected vice-president in charge of operation of the Union Pacific System, with headquarters at the same point. Mr. Jeffers' election as vice-president becomes effective on October 31 at the time of the retirement from active service of **Edgar E. Calvin**, present vice-president in charge of operation. Mr. Jeffers has been in the service of the Union Pacific for more than 38 years. He was born on January 2, 1876, at North Platte, Neb., and entered railway service when 14 years of age as a messenger and call boy at



William M. Jeffers

that point. While a messenger, he learned telegraphy and became a train dispatcher at North Platte before he was 19 years old, having previously served

as a clerk in the maintenance of way department and as a timekeeper and extra foreman on a steel gang. In 1900 Mr. Jeffers was advanced to chief dispatcher at North Platte, where he remained until 1905 when he was promoted to trainmaster at Green River, Wyo. He was transferred to Denver in 1906 and in the following year he was promoted to assistant superintendent at Green River, becoming superintendent at that point in 1909. From 1911 to 1916 Mr. Jeffers served successively as superintendent of the Utah, Wyoming and Nebraska divisions and he was then promoted to general manager of the Union Pacific unit of the system. During federal control of the railroads he was also in charge of all railroad terminals at Omaha and Council Bluffs, Iowa, and was fuel administrator in those cities. From 1923 to 1928, Mr. Jeffers was chairman of the committee of general managers of the Western Railroads, handling labor disputes in western territory.

Mr. Calvin will retire from active service after spending nearly 55 years in railway work. He was born on October 16, 1858, at Indianapolis, Ind., and first entered railway service at the age of 15 years as a messenger on the In-



Edgar E. Calvin

dianapolis, Cincinnati & Lafayette (now part of the Cleveland, Cincinnati, Chicago & St. Louis). Later he was advanced to telegraph operator and during 1876 he stayed out of railway service to attend school. In April, 1877, Mr. Calvin became operator and station agent on the Union Pacific at Fort Steele, Wyo., subsequently serving as operator at Medicine Bow, Wyo., Red Desert, Granger and Carbon, and as agent at Carbon and Green River, Wyo. From April, 1882, to June, 1887, he served as train dispatcher at Logan, Utah, and Pocatello, Idaho; as chief dispatcher at Pocatello; as trainmaster at Butte, Mont., and Pocatello and as conductor at various points. Mr. Calvin then left the Union Pacific to become superintendent of the Missouri Pacific, returning to the former road in February, 1891, as superintendent of the Idaho division at Pocatello, where he remained until June, 1895, when he was appointed

general superintendent of the International & Great Northern, with headquarters at Palestine, Tex. He again returned to the Union Pacific System in March, 1897, as general superintendent of the Oregon Short Line, with headquarters at Salt Lake City, Utah. Six years later he was promoted to assistant general manager of the Oregon Short-Line and in April, 1904, he was elected vice-president and general manager of the Oregon Railroad & Navigation Company (now the Oregon-Washington Railroad & Navigation Company), with headquarters at Portland, Ore. From February, 1905, to July, 1912, Mr. Calvin served as vice-president and general manager of the Southern Pacific lines west of El Paso, Tex., including those in California and Oregon and he then became vice-president in general charge of operation and construction of the Southern Pacific lines in the same territory. On February 1, 1914, following the segregation of the Union Pacific and the Southern Pacific, he was transferred to the former system as vice-president and general manager of the Oregon Short Line, with headquarters at Salt Lake City, and two years he was elected president of the Union Pacific and Oregon Short Line units of the system, with headquarters at Omaha. During federal control of the railroads he served as federal manager of the Union Pacific System and upon the return of the railroads to private control in March, 1920, he became vice-president in charge of operation of the system.

Financial

Earle B. Sloan, chief engineer and assistant to the president of the Southern Pacific of Mexico, with headquarters at Guadalajara, Jal., has been promoted to fiscal representative and general agent, with headquarters at Mexico City, D. F., succeeding **George F. Jackson**, who has retired from active service.

Operating

Frank E. Stull, chief dispatcher of the Great Northern at Grand Forks, N. D., has been promoted to assistant superintendent of transportation, with headquarters at St. Paul, Minn.

Albert Wilcox, general superintendent of transportation of the Western region of the Canadian National, with headquarters at Winnipeg, Man., has been promoted to assistant to the general manager of that region, with headquarters at the same point. **V. I. Smart** has been promoted to general superintendent of transportation to succeed Mr. Wilcox.

G. A. Bowler, assistant superintendent on the Canadian Pacific with headquarters at Montreal, Que., has been transferred in the same capacity to the Laurentian division, succeeding **C. J. McGregor**, transferred. **J. L. Palethorpe**, assistant superintendent at

Smiths Falls, Ont., will replace Mr. Bowler at the Montreal Terminals. **C. O. McHugh**, transportation assistant at Montreal, Que., will succeed Mr. Palethorpe as assistant superintendent at Smith Falls.

E. Sullivan, trainmaster of the Conway Springs, Roper and Arkansas City districts of the Southern Kansas division of the Missouri Pacific, with headquarters at Arkansas City, Ark., has been transferred to the Colorado division, with headquarters at Hoisington, Kan. The position of assistant trainmaster at Hoisington, formerly held by **E. K. Lucy**, has been abolished. **R. L. Hardgrave** has been appointed trainmaster of the Central division, with headquarters at Van Buren, Ark., succeeding **F. L. Hays**, who has been transferred to the Coffeyville district of the Southern Kansas division, with headquarters at Coffeyville, Kan. Mr. Hays replaces **C. A. Fink**, who has been transferred to Arkansas City to succeed Mr. Sullivan.

Nicholas Procel, chief clerk to the general director of the National of Mexico, with headquarters at Mexico City, D. F., has been promoted to superintendent of car service, with headquarters at the same point, succeeding **P. Lopez**, who served temporarily as acting superintendent of car service following the death of **C. Salazar**. Mr. Procel has been in the service of the National Railways for about 21 years. He was born on February 10, 1880, at Valle de Santiago, Gto., and after attending regular school and high school in Mexico, he entered railway service at the age of 15 years as a telegraph operator on the Mexican Central (now



Nicholas Procel

part of the National of Mexico) at Mexico City. In 1904 he became a conductor with the Pullman Company at Chicago, returning to Mexico in 1906 in the office of the superintendent of car service of the National of Mexico. Later he was advanced to chief clerk to the superintendent of car service and in 1914 he was advanced to superintendent of transportation. During the latter part of 1915 and in 1916 Mr. Procel was in charge of contracts for the National Railways. He was then appointed chief

clerk to the general director, serving for a short time in 1919 as chief clerk to the superintendent of car service. In August, 1919, he was appointed assistant general superintendent of the Mexican Railway, with headquarters at Mexico City, where he remained until May, 1920, when he was again appointed chief clerk to the general director of the National Railways at Mexico City. In June of the same year Mr. Procel was promoted to assistant to the general director and in June, 1921, he was further promoted to general manager. From February, 1925, to August, 1928, he served as chief clerk to the general director, his promotion to superintendent of car service becoming effective on September 1.

Newton A. Williams, general superintendent of the Northern district of the Union Pacific, with headquarters at Cheyenne, Wyo., has been promoted to general manager, with headquarters at Omaha, Neb. Mr. Williams' promotion to succeed **W. M. Jeffers**, who has



Newton A. Williams

been elected vice-president in charge of operation of the Union Pacific System, becomes effective October 31. Mr. Williams has been in the service of the operating department of the Union Pacific for 12 years. He was born on a farm near Laclede, Mo., on March 29, 1878, and attended district school and the Chillicothe (Mo.) Normal School. Until he was 20 years of age Mr. Williams worked on his father's farm and then became a section man on the Hannibal & St. Joseph (now part of the Chicago, Burlington & Quincy) in July, 1888. A few months later he entered the train service of the same railroad as a brakeman, where he remained until January, 1902, when he became a brakeman on the Denver & Rio Grande (now the Denver & Rio Grande Western). The following year he was advanced to conductor and in August, 1909, he was promoted to assistant superintendent of the Salt Lake division, with headquarters at Salt Lake City, Utah. In July, 1910, Mr. Williams was promoted to superintendent of the Salt Lake division and in March, 1912, he was transferred to the Green River division, with headquarters at Helper, Utah. He resigned

from railroad service in 1914 to engage in business but returned in 1916 as trainmaster on the Union Pacific at Grand Island, Neb. In 1917, he was promoted to assistant superintendent at Kansas City, Mo., and in the following year he was again promoted to superintendent of the Western division, with headquarters at Green River, Wyo., being transferred to the Wyoming division in 1922. Mr. Williams was appointed general superintendent of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., in the latter year and was transferred to the Northern district of the Union Pacific in 1925.

Traffic

M. C. Daly has been appointed general agent of the Groveton, Lufkin & Northern, with headquarters at Houston, Tex.

G. A. Remington, general agent in the freight department of the Chicago & Northwestern at Omaha, Neb., has been promoted to assistant general freight and passenger agent, with headquarters at the same point, succeeding **D. M. Davis**, resigned.

W. L. Donaldson, general freight traffic agent on the Lehigh Valley with headquarters at New York, has been appointed assistant western traffic manager, with headquarters at Chicago. **Ira S. Auch**, assistant general freight agent at Buffalo, N. Y., has been appointed general freight traffic agent, with headquarters at the same point. The jurisdiction of **M. J. Ormond**, general eastern freight agent at New York has been extended to include all freight agencies at Philadelphia, Pa.

Engineering

Charles E. Cate, assistant to the chief engineer of the Southern Pacific of Mexico, with headquarters at Guadalajara, Jal., has been promoted to chief engineer, with headquarters at the same point.

Mechanical

The headquarters of **W. T. Fitzgerald**, master mechanic of the Nebraska-Colo-rado division of the Chicago Rock Island & Pacific, have been moved from Goodland, Kan., to Fairbury, Neb.

D. W. Campbell, master mechanic on the Canadian National at Winnipeg, Man., has been transferred to the Kamloops division of the British Columbia district, with headquarters at Kamloops, B. C., to succeed **E. E. Austin**, who will retire from active service on October 1.

Obituary

William H. Starks, chief fuel inspector of the Louisville & Nashville, with headquarters at Louisville, Ky., died of pneumonia at his home in that city on September 17.

Colonel Edward Colston, counsel for the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis, the Southern and the New Orleans & Texas Pacific, died at Hot Springs, Va., on September 20. Colonel Colston was 84 years of age.

Frank L. Hay, superintendent of sleeping and dining cars of the Great Northern from 1912 to 1920, died at Cincinnati, Ohio, on September 14. Mr. Hay was appointed district superintendent of sleeping, dining and parlor cars of the Canadian Pacific, with headquarters at Vancouver, B. C., in 1909 and in the following year he was promoted to assistant general superintendent of the same service, with headquarters at Montreal, Que. Following his resignation from Great Northern service in 1920, he was in the service of the Cuban government and later managed a hotel in Cincinnati.

Arthur E. Stilwell, railroad builder and former president of the Kansas City, Pittsburgh & Gulf, died on September 26 at the age of 68, after an attack of apoplexy. He had not been actively engaged in business for the past six years. The first road built by Mr. Stilwell was the Kansas City Belt Line; later he constructed a road from Kansas City to the Gulf of Mexico known as the Kansas City, Pittsburgh & Gulf which later became the Kansas City Southern. He also attempted to build a line from Kansas to the Mexican National Railroad, this project, however, was never completed due to increased labor and material costs and revolutionary disturbances.

Arthur C. Irons, formerly general passenger agent of the Chicago Great Western, who died at Detroit, Mich., on September 16, was born on May 21, 1880, at Chicago. He entered railway service when 18 years of age with the Western Passenger Association at Chicago and in January, 1904, he became assistant rate clerk in the passenger department of the Great Western. From July, 1904, to May, 1910, Mr. Irons served successively as assistant ticket agent at the Dearborn Station, Chicago, as assistant ticket agent for the Chicago, Rock Island & Pacific, as rate clerk in the passenger department of the Great Western and as chief clerk in the passenger department of the same railroad. He was then promoted to assistant general passenger agent at Chicago. Mr. Irons was promoted to general passenger agent at Chicago in November, 1918, resigning in July, 1921, to become a member of the brokerage firm of F. C. Van Ness & Son, Toledo, Ohio.

Charles Meriweather Browning, formerly general manager and traffic manager of the Louisville & Nashville (now part of the Louisville & Nashville) died at the Woodford Memorial Hospital at Versailles, Ky., on September 16 after an illness of more than a year. Mr. Browning was born on April 15, 1858, at Hernando, Miss., and entered railway service when 17 years old as agent for the Louisville & Nashville at New

Hope, Ky. For the following 25 years he served successively in that position and as agent on the L. & N. at Campbellsville, Ky., and Clarksville, Tenn., on the Arkansas & Texas at Tyler, Tex., and on the L. & N. at Midway, Ky., and as general freight and passenger agent of the Versailles & Midway, and the Richmond, Nicholasville, Irvine & Beattyville (both now parts of the L. & N.). From July, 1900, to July, 1901, Mr. Browning served as superintendent and general freight and passenger agent of the Louisville & Atlantic and he was then promoted to general manager, becoming traffic manager in September, 1903. Since January 1, 1904, when he left railroad service, he had been secretary-treasurer of the Seller Carriage Company, Versailles.

Ralph Hills Howard, chief engineer of the Wabash, with headquarters at St. Louis, Mo., died at Petosky, Mich., on September 20 following a stroke of apoplexy. Mr. Howard had been in the service of the Wabash for the past 13 years. He was born on August 15, 1870, at Zanesville, Ohio, and received his elementary education in the high school in that city. Later he studied under Edmund Turner, C. E., entering railway service in October, 1889, as a draftsman on the Cincinnati & Muskingum Valley (now part of the Pennsylvania) and advancing successively to assistant on engineer corps, chief clerk to the engineer of maintenance of way and assistant engineer. In April, 1901, he became an assistant on the engineer corps of the Pittsburgh, Cincinnati, Chicago & St. Louis (now part of the Pennsylvania) at Pittsburgh, Pa., where he remained until July of the following year when he was appointed assistant engineer on the St. Louis division of the Vandalia (also now a part of the Pennsylvania). Mr. Howard was appointed principal assistant engineer in charge of construction and improvements of the Chicago & Eastern Illinois in April, 1905, being promoted to en-

gineer of maintenance of way in charge of all maintenance and construction work in October of that year. From May, 1910, to January, 1911, he was engaged in special engineering work in connection with railroad properties for a group of eastern capitalists, then being appointed chief engineer of the



Ralph Hills Howard

Great Southern Lumber Company and engineer of maintenance of way of the New Orleans & Great Northern in charge of construction and maintenance. In June, 1911, Mr. Howard was appointed general manager of that railroad, where he remained until May, 1915, when he was appointed chief engineer of maintenance of way of the Wabash with headquarters at St. Louis. He was promoted to chief engineer of the Wabash on October 1, 1923.

GROSS REVENUES equivalent to \$65,211,000 and operating expenses of \$48,000,000 were reported by Dutch railways for the year 1927. These figures compare with revenues of \$65,682,000 and expenses of \$47,959,500 in 1926. The lessened profits are attributed to reduced passenger rates, since returns from freight revenue were higher, despite certain lower tariff schedules.

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On the Pennsylvania